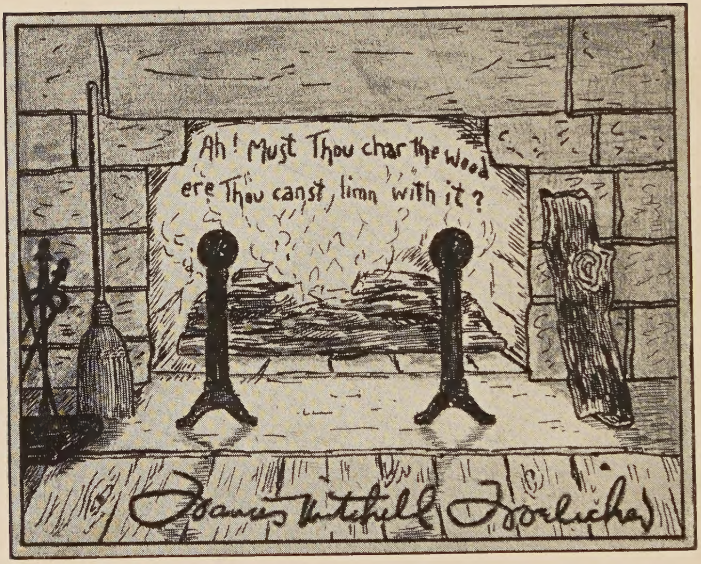
ANDRÉE'S STORY


Ah! Must Thou char the wood ere Thou canst, limn with it?
Frances Mitchell Froelicher

10¢

Best wishes to the Froelicher
family as always
from
the Canbys.

Xmas, 1930.

ANDRÉE'S STORY

The Complete Record of His Polar Flight, 1897

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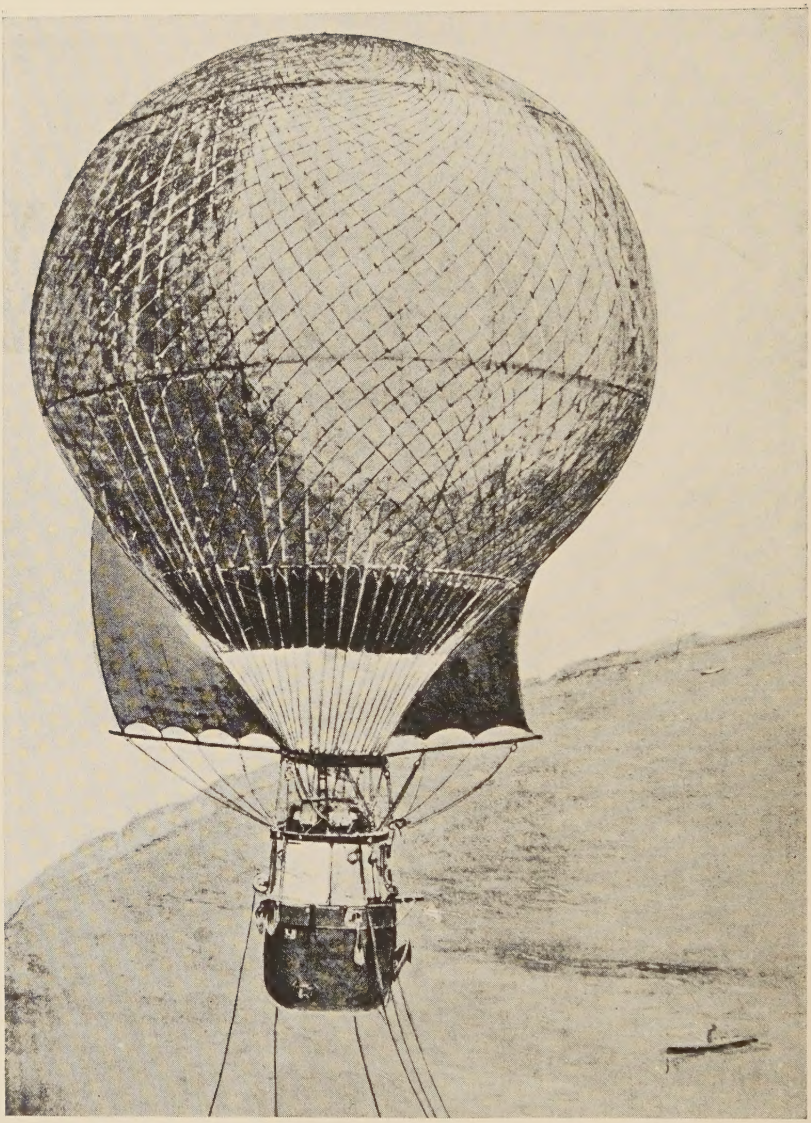

THE EAGLE IN FLIGHT
From a contemporary drawing

ANDRÉE'S STORY

The Complete Record of His Polar Flight, 1897

From the Diaries and Journals of
S. A. Andrée, Nils Strindberg, and K. Frænkel,
found on White Island in the Summer of 1930
and edited by the
Swedish Society for Anthropology and Geography

Translated from the Swedish by Edward Adams-Ray

The Viking Press · New York
1930

MED ÖRNEN MOT POLEN

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Introduction

On August 5 and 6, 1930, a Norwegian expedition, on board the *Bratvaag* of Aalesund, equipped both for scientific investigation and for sealing, while on its way to Franz Joseph Land, went ashore on the south-western point of White Island, which forms the easternmost portion of the Svalbard (Spitsbergen) Archipelago. The scientific leader of the expedition was Dr. Gunnar Horn, a geologist, representing the Norwegian Svalbard and Polar Sea Research Institute. On landing, on August 6, the sealers of the party discovered the remains of the Andrée Expedition which had been lost thirty-three years before.

When the news of the discovery of Andrée's last camp on White Island was published on August 22, it led to immediate action by both the Swedish and Norwegian authorities. The first measure taken by the Swedish Government was to appoint a scientific Commission which, in co-operation with the experts designated by Norway, would receive, investigate, and prepare the find of the *Bratvaag* Expedition. The Swedish representatives in this composite Commission were: Professors G. Hedrén and N. Lithberg, assisted by E. W. Warfwinge, M.D. and S. Köhler, C.E. The Norwegian Commissioners were: A. Hoel, Lecturer at the University of Oslo and the Chief of the Svalbard Office in that city, B. Dybwad-Holmboe, Chief Physician in the Province of Troms, and Dr. G. Horn.

Simultaneously with the arrival of this Commission in Tromsö there came a troop of journalists from every part of the world. One of these, Knut Stubbendorff—who represented *Dagens Nyheter* and *Veckojournalen,* of Stockholm, as well as the Hearst newspaper syndicate associated with these two papers—hired the *Isbjörn,* a sealing vessel, and on August 28 started for White Island. The new expedition landed on September 5. The melting of the snow had now laid bare parts of the Andrée camp which had not been accessible when the *Bratvaag* visited the place. From September 5 to 8 the camp-site was thoroughly investigated under the direction of Stubbendorff, and the remainder of the relics of the expedition was found and brought back to Tromsö.

Dr. Horn's account of the discovery was published by a number of newspapers, including the *Svenska Dagbladet* of Stockholm and the *Aftenposten* of Oslo, but, at the request of the Swedish Government, all the Andrée documents found by the *Bratvaag* Expedition were handed over to the Commission in Tromsö without their contents being published. While still at the island in the Polar Sea, Stubbendorff sent by radio reports of the documents found by the *Isbjörn* Expedition, and these communications were published by the papers which had financed the undertaking. But at Tromsö, all the material found by the *Isbjörn* was handed over to the Commissioners there, and received the same care and protection as the relics found by the *Bratvaag*. By far the most important document found on White Island was Andrée's larger diary, brought back by the *Bratvaag*. At the request of the Swedish Government a brief summary of the book was made, and this was published on September 20. Andrée's second diary, in the state in which it was found, was illegible, but the chemico-photographic treatment applied by Professor T. Svedberg and Dr. H. Andersson made partly legible the four and a half pages of which it consists, and a preliminary report was communicated to the press on October 17.

On September 26, the Swedish Anthropological and Geographical Society—which, by its memorial on the Andrée Expedition, published in 1906, and by the striking of a commemorative plaque, had kept alive the memory of Andrée and his comrades—was commissioned by the Government to take over, temporarily, the care of the finds made at White Island, and to prepare for publication a book giving a full account of the Andrée Expedition. The members of the committee nominated by the Society for this task were: Professor Nils Lithberg, President of the Society; Chief Intendent Axel Lagrelius, its Treasurer; and Professors J. G. Andersson and Hans W. Ahlmann. The committee thus appointed met on the thirtieth of the same month, together with representatives of the Andrée, Strindberg, and Frænkel families. The relatives of the polar travellers then resolved to make over to the Swedish Anthropological and Geographical Society the future care of all the finds from the camp at White Island, at the same time entrusting to the Society the publication of a book on Andrée's Polar Expedition.

The publishing firm of Albert Bonnier—which had taken the initiative in the sending of the *Isbjörn* Expedition, and therefore had control over its reports as well as over such illustrative material as it had brought back—came to an agreement with Chief Intendent Lagrelius, the Treasurer of the Society, concerning the publication of the volume which is here laid before the public. On Professor Andersson's suggestion the committee proposed to the Government that any money accruing from the sale of the book be applied to a fund for scientific research, which should serve as a memorial of the achievement of Andrée, Strindberg, and Frænkel.

But before the Society's committee had come to that determination, the same plan, in all its scope, had been shaped by Andrée's nephew, Sven Spånberg of Ankarsrum. In a letter, written shortly after the *Bratvaag's* discovery and which was later placed at the disposal of the editorial committee, Mr. Spånberg says: "The plan might also be adopted of making over the entire right of publication to the Geographical Society, which should also be entrusted with the task of utilizing any financial benefits for the creation of a fund." He also expressed the thought that the relatives of the explorers should not profit financially by the publication. "The chief thing is that the memory of Andrée be honoured."

These expressions have made Sven Spånberg the founder of the Andrée Fund which is now being formed, but the same generous readiness to make a sacrifice in this matter for the sake of the Andrée Memorial Fund has been displayed by the families of Strindberg and Frænkel.

"The chief thing is that the memory of Andrée be honoured"—the Society has made this thought entirely its own. The plans for the organization of the Fund have, as yet, not been drawn up in detail, but it seems evident that when this is done, special emphasis will be laid on those branches of geographical research which most interested Andrée and his companions.

The documents found at the White Island camp consist of the following papers:

a) *Andrée's first diary*, embracing the period between July 11 and October 2, 1897, in 118 small octavo pages.

b) *Andrée's second diary*, consisting of four and a half partly legible pages, in small octavo.

c) *Strindberg's memorandum almanac for 1897*, containing short, unconnected notes from July 11 to October 17, 2 pages of observations for the period July 11–19, and 37 pages of short notes and observations made between July 11 and 15.

d) *Logbook I, kept by Strindberg*, from July 15–September 4, consisting of 120 pages in small octavo and containing mostly astronomical observations; towards the end, however, there are also some stock-taking lists, bills-of-fare, etc.

e) *Logbook II, kept by Strindberg,* for the period September 5 to October 2, on 14 pages in small octavo, and containing chiefly astronomical observations, some inventories, sketches, etc. At the end of the same book:

f) *Letters in shorthand from Strindberg to his fiancée,* written between July 21 and 31, in 9 small octavo pages.

g) *The meteorological journal kept by Frænkel* during the period July 14–October 3.

h) *The 3 maps and diagrams drawn by Strindberg.*

The task of compiling the four chapters based on the above documents: "The Flight of the Eagle," "The March across the Ice towards Franz Joseph Land." "Towards the Seven Islands," and "Caught in the Ice," has been entrusted to Professor Ahlmann. In the performance of this work, valuable assistance was given by Axel Edström, President of the Geographical Association in Stockholm and Treasurer of the University of Stockholm, who has also prepared and superintended the publication of the documents and the arrangement of the illustrative material. The object of the above chapters is to give a fluent and, as nearly as possible, a chronologically true picture of the fate of the expedition, from the beginning of the balloon flight, on July 11, 1897, to the catastrophe on the ice-floe near White Island on the morning of October 2. All the memoranda and other notes have been followed as closely as possible, and nothing has been added to the account but such words and phrases as were necessary to combine the memoranda, very often brief, unconnected, and chronologically irregular, into a coherent narrative, or to make these notes more easily understandable. Andrée's and Strindberg's own words have been used wherever possible, although quotation marks have been used only for longer extracts. In some instances, it was considered necessary to make a word here or there plainer, or to change the order of a few sentences. Most of Andrée's statements on the thickness of the ice have not been included, as it is uncertain to what they refer precisely. Also several references to the samples collected by Andrée, and one or two descriptions of birds and fishes, have been excluded, as tending to make the story too ponderous. Such matter will be left for a future purely scientific work on the Andrée Expedition.

As all the relevant documents on which the above chapters are based are published here *in extenso*—with the exception of Frænkel's meteorological journal—the reader will be able to form his own judgment respecting the fidelity with which the chapters in question have followed the originals.

It has fallen to the lot of Professor N. Lithberg to reconstruct, in the chapters entitled "On White Island" and "The Camp on White Island and Its Equipment," the probable course of events in the epilogue of this polar drama, and to make a critical survey of the whole of the material found. This summary is based on the accounts of their discoveries written by Horn and Stubbendorff, on the equipment itself, and on the extremely scanty notes in Andrée's second diary and Strindberg's almanac. Professor Lithberg has also written the chapter on the three men's "Journey Home," which begins at the moment their remains were brought ashore at Tromsö and ends with an account of their final restoration to their native country.

Dr. Gunnar Horn describes the *Bratvaag* Expedition, and the discovery of the Andrée camp; Knut Stubbendorff gives his account of the *Isbjörn* Expedition.

The short biographies of the three polar travellers, and the chapter on "The Flight of the Eagle" are, in all essential details, summaries of the memorial publication issued by the Society in 1906, *S. A. Andrée, His Companions and His Polar Flight, 1896–1897*. The biography of Andrée included in the latter publication was written by Mrs. Gurli Linder, who has also summarized it for this volume. The account of "The Balloon and Its Construction" was written by Lieutenant-Colonel G. V. E. Svedenborg, who, in a certain sense, is the sole survivor of the Andrée Expedition. In 1897, he had accompanied the party to Dane Island as an alternate in case any of the others were prevented from making the flight.

The geodetic work, on which has been based the map (page 209) showing the route taken by the expedition, in the balloon and on foot, was done by B. V. Aurell, who, in "Remarks on the Map of the Route Taken by the Andrée Expedition," explains the grounds on which he has based his calculations.

J. Hertzberg succeeded, after many weeks of painstaking labour, in developing several of the photographs taken by the Andrée Expedition. The best of these pictures, which have lain buried in the ice of White Island for thirty-three years, form part of this volume. In his "Development of the Photographs of the Expedition" Hertzberg gives an account of his methods.

Supported by the meteorological data in the diaries, Chief Director A. Wallén has written the chapter "The Weather on the Balloon Flight." Major-General K. A. B. Amundson and Professor I. Malmer are the authors of the "Technical Account of the Flight," in which they comment on the factors which ended the flight of the Eagle.

Professor H. U. Sverdrup, the well-known polar explorer, and Professor E. Lönnberg have written respectively "Pack-Ice," and "Animal Life on the Pack-Ice," to elucidate the numerous notes found in Andrée's diaries respecting these phenomena.

These brief commentaries[1] on the expedition form popular summaries of the special papers to be collected in *Geografiska Annaler*—the Journal issued by the Swedish Anthropological and Geographical Society—as a publication dealing with the scientific results of the Andrée Expedition.

THE EDITORIAL COMMITTEE

Stockholm, October 24, 1930.

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[1] Grouped together as Part Four of this volume, "The Verdict of Science."

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Part One

THE BACKGROUND

I

The Three Men

Salomon August Andrée

Salomon August Andrée was born at Grenna, Sweden, on October 18, 1854. His father, Claes Georg Andrée was an apothecary; his mother came of an old clerical family which had boasted many prominent members. On both sides, August Andrée inherited a keen intelligence, strong will, tenacious perseverance, and a rich fund of humour, together with the most upright of characters. There is still in existence an account of him written by his mother when Andrée was a child. She says that "from the very first moment he opened his eyes to the light of day he has been an uncommonly big and strong child, and his mental development, too, was rather ahead of his years. His questions were very often difficult to answer for he was never satisfied with the shell, but always did his best to find his way to the core. He was specially delighted in games which required the working out of some experiment or problem. He was, perhaps, a stubborn and defiant child, but never really what one calls naughty, and he would never have been able to hurt a harmless animal. If he was treated unjustly by any companion I am afraid that he spared no effort to pay him back, but I am just as sure that he was never prompted by a feeling of revenge to complain of anyone—for by nature and from principle he was magnanimous."

All coddling and indulgence were banished from the education found in the home of the Andrées, where five sons and two daughters grew up together. The children were hardened by means of sport and life in the open air, and August Andrée's constitution, naturally strong, developed soundly.

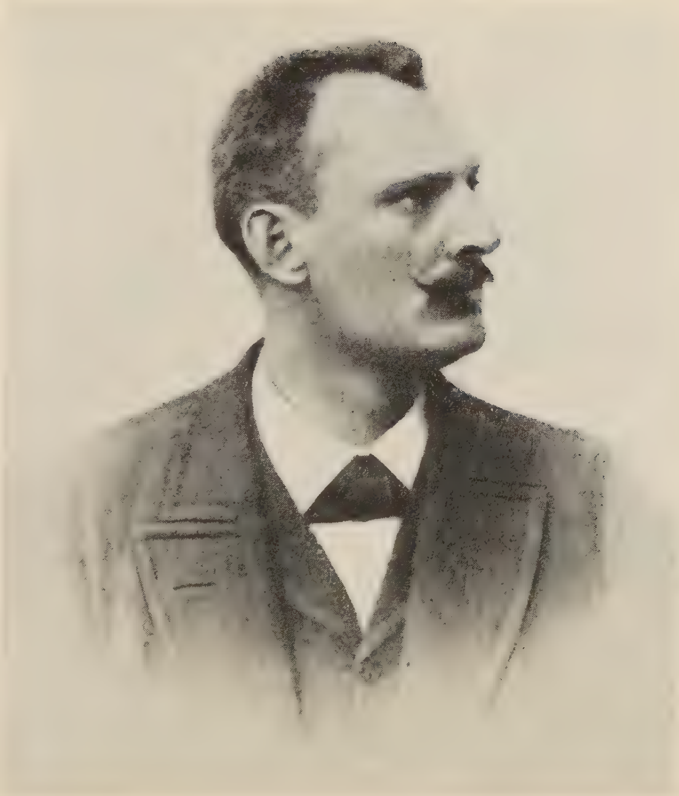
He received his earliest instruction from his mother and then at a two years' tutoring course in Grenna, whence, in 1865, he was transferred to the State High School in Jönköping. He did very well here. On one Prize Day, one of the fathers present said to a neighbour: "That lad will wear out a pair of soles going up to receive his prizes." The answer was: "He may, if he likes, for he's *my* son!"

But when the lad came home for the Christmas holidays in 1868, he thumped his fist on the table and cried: "I will not study one day more at school, and if you don't take me away of your own accord, I'll run away!" His father, who saw that his son was "a chip of the old block," said very calmly: "Well, on the whole, you are right, but you mustn't stop in the middle of the school year. If you do well during the next term, I'll let you finish in the spring!" Said and done! Andrée left the classical school in the fifth term. In the autumn of 1869 he went up to Stockholm and, after a preparatory course, he gained admission to the Royal Institute of Technology.

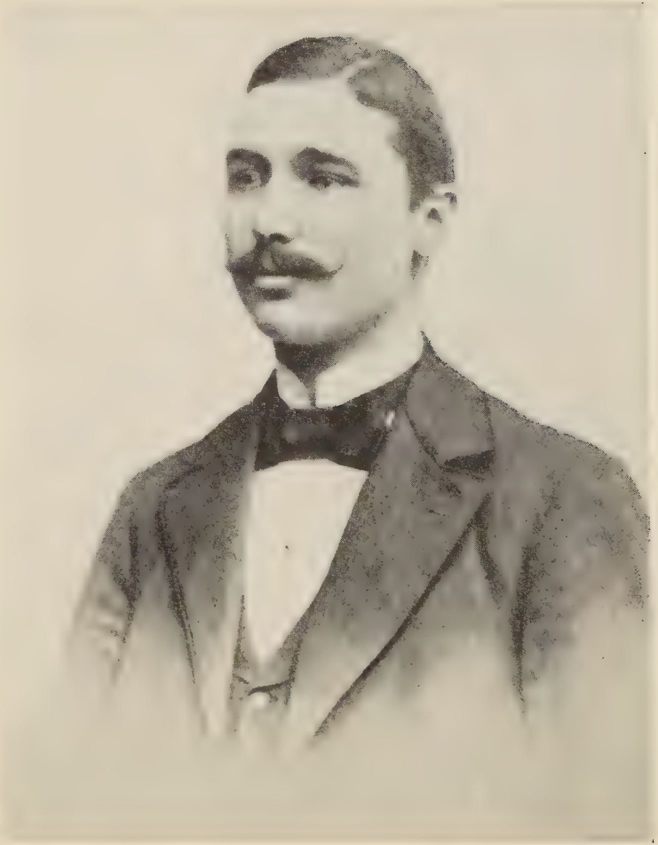
Andrée found himself quite at home at this scientific institution. He used to say that in one respect he had been a perfectly happy person—because he had been allowed to devote himself to the profession for which he undoubtedly had a knack and also a liking. His favourite subject was physics, and his teacher in it, Professor Robert Dahlander, assisted him in later years, both in word and deed. But Andrée devoted himself to his other subjects, too, in a most exemplary manner. His interest in social matters also came to the fore during this period. Sometimes, dressed like a labourer, he would take his meals at humble eating-houses, and enter into conversation with the other guests there.

In 1873, Andrée passed his final examination at the Royal Institute, and, after spending two years as draughtsman and designer at Göransson's Mechanical Works in Stockholm, he went abroad, "bold, proud, and just a little cocky," as people then characterized him. He went to America, and visited the Centennial Exposition

S. A. Andrée.



Knut Frænkel



Nils Strindberg

at Philadelphia, 1876. He applied to the Swedish Consul General for work, and was offered the task of janitor for the Swedish section of the Exhibition. He accepted the offer with gratitude, for it gave him the opportunity of studying the exhibits and also of gaining his livelihood. Later on in life, whenever he saw a street-sweeper, he would often stop and say: "I learned that art when I handled a birch-broom in Philadelphia."

Even before his arrival in America, Andrée had been seized by a passion for aeronautics which never afterwards left him. While in Philadelphia, he called on Mr. John Wise, an old, experienced balloonist, who had made some 400 ascents, and from this man Andrée learned the elements of his future art.[1]

We still have Andrée's memoranda of his expenses at that time, and it is touching to see the smallness of the sums which come under the heading "food." The bad nourishment and his use of ice-water brought about a serious illness, and after some six months he found himself obliged to leave the United States. After regaining health at home, he was employed as a mechanical engineer's assistant, but finally purchased a machine shop, which he carried on in partnership with a friend. But the concern did not prove a good investment, and he had to wind up the business. "When I left the business," he tells us, "I received several good offers for I had to some extent earned a name for honesty and assiduity. But I had acquired a certain distaste for business, partly because it went against me to be constantly depreciating rivals when I wished to sell, and constantly depreciating goods when I wished to buy, and also because I had come to the opinion that a constant striving for money tended to kill my interests in things which I valued highly."

Professor Dahlander then procured him an assistantship at the Royal Institute of Technology. The pecuniary returns were not very flattering, but the work interested him and he lived on sixpence a day.

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[1] This aspect of his life is described in the following chapter.

Andrée's many private memoranda from the youthful years show that he was very well read, and that he had a vigorous interest in every sort of human question: religion, philosophy, history and, first and foremost, natural science—all in a confused mixture. For instance immediately after the entry: *Was der Vernunft entgegen ist, ist gewiss dass es Gott vielmehr entgegen ist"* (Luther) [1] appears: "What gases are there in the seed-pod of a plant?"—and: "Should not one assign a neutral place—preferably an uninhabited island—to nations at war with each other?" The memoranda display his conversion to a purely natural scientific view of life and an absolute confidence that an ever-increasing knowledge of the laws of nature will abolish faith in all so-called supernatural things. He writes: "Mankind is still only half awake."—"The time will come when the natural scientific method will be applied to every science."—"Of what use is it, one may ask, for workmen to learn a little about astronomy, mechanics, meteorology, etc.? Why, it teaches them that everything is subject to laws."

In 1882 steps were taken to organize an international scientific enterprise. The aim was a meteorological and physical investigation of the two polar regions. The participants were: Germany, England, France, Austria, Holland, Russia, the United States, Sweden, Norway, Denmark, and Finland. Fourteen stations were set up, twelve in the northern and two in the southern polar tracts. Sweden's station was fixed at Spitsbergen, and the leader of the Swedish expedition was Nils Ekholm, Assistant Director at the Meteorological Institute of Stockholm. Andrée was appointed to carry out the aero-electrical observations and to procure the technical equipment.

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[1] "That which reason is against, God, we may be sure, is still more against."—*Trans.*

The expedition arrived at Spitsbergen in July 1882 and took up its winter quarters at Cape Thordsen in Isfjorden.

Later on, in a memorial paper published by the Royal Aeronautical Society, Ekholm declared that Andrée directed the aero-electrical observations with the greatest success. Of the fourteen expeditions, he says, the Swedish obtained the best results in just these observations. By his energy and inventive faculty, Andrée succeeded in keeping water in a fluid condition in the collector at a temperature of –22° F. As a result, this series of observations was carried through almost without interruption, while the greater number of the other stations took no aero-electrical observations, and others had to abandon them as soon as the temperature had fallen a few degrees below freezing-point. The number of Swedish observations was about 15,000.

Andrée also endeavoured to find a correlation between the simultaneous variations of aero-electricity and geo-magnetism. "This," he says in a letter to Professor Dahlander, "has been hard work, for it has been necessary to calculate about 5000 values of the total intensity of geo-magnetism." He also made an investigation respecting whirling snow, the result of which he published in a little paper.

In order to discover whether polar darkness really affected the colour of the face, or if the yellowish-green tinge observed when daylight came resulted from the fact that the eyes of the polar investigators were dazzled by the light, Andrée voluntarily allowed himself to be shut up in a house for a whole month, where he remained indoors uninterruptedly all day. When, at the end of the month, Andrée once more went out into the light of day, it proved that the colour of his face really was yellowish-green, while the other men's faces, under the influence of light, had begun to resume their normal hue. On the other hand, it was proved that polar darkness does not bring about colour-blindness.

Andrée himself by no means overrated his work during this expedition. He writes: "As usual, much work and little result, but I have not wasted my time, at least."

When he determined to submit to the above-mentioned confinement, he wrote in his diary: "Dangerous? Perhaps. But what am I worth?"

"What shall I do when I come home?" writes Andrée in his diary from Cape Thordsen. When the Patent Office was reorganized in 1885, however, he was appointed the head of its technical department, a title which was afterwards changed to Chief Engineer. With this appointment to the Patent Office, Andrée may be said to have found his right place. His great capacity for work, his solid technical knowledge, and his living interest in the development of industry made him especially suited to his post. His chief, Count Hugo Hamilton, makes some humorous remarks in his memoirs respecting Andrée's stubbornness. When he was obliged to call Andrée's attention to the fact that laws and ordinances placed hindrances in the way of carrying out his ideas, he received the reply: "Well, then the law is wrong and shall be altered." And, by means of several publications, he succeeded in bringing about various improvements in laws and regulations, to the advantage of inventors and applicants for patents. He took the initiative in founding the Society of Swedish Inventors, which has been, and still is, of great benefit to its members.

Andrée, with his sober intellectualism, his systematic turn of mind, and his unbounded belief in the power of applied science, was in a high degree a child of his time—the eighties of the last century, with their practical ideas and their fierce zeal for reform. He possessed the most optimistic belief in the power of technology and industry to make the human race happier, by creating for the masses better conditions of existence and more leisure, with its attendant opportunities for mental development and bodily culture. "The time will come when pure science will be far behind technology (think of electricity!). The technician delves into every hiding-place, and must solve problems that the man of science has never thought of." He thought that through these agencies the working class would have a chance to obtain an intellectual and scientific training which, in its turn, would supply industry with more wide-awake and intelligent workers.

It was Andrée's intention to publish a series of papers dealing with the influence of technology on practically every branch of human activity: on the general development of mankind, on liberty, hygiene, athletics, language, architecture, military science, the home, marriage, education, etc. Andrée had time to complete and publish only one of these pamphlets, that on the question of Industry and Woman. He has left a number of remarks and preparatory sketches for the other papers, and some of these are on subjects of present-day interest: for example, Is specialization, carried to extremes, harmful to the workman?

At the age of 26, Andrée took part in a competition on the question: "What are the defects in the existing system of education for girls?"—and gained the first prize. He recommended a more practical training, which should have a scientific basis. His interest in social matters found expression in various publications, and when, during the nineties of last century, he was for a period a member of the Municipal Council of Stockholm, he brought forward a motion for a ten-hour instead of a twelve-hour working day for the men employed by the city, and an eight-hour day for the women. The mere proposal of such a motion was enough to lose for Andrée all further consideration, said someone at a public meeting. And, in fact, he lost his place in the Council.

Andrée had so little appreciation of literature and art and was so altogether unmusical that it must be considered a defect in his character. If he happened to be enticed to visit an exhibition of art or to attend the opera, his companions had every reason to repent of their success, for he always managed to spoil their own pleasure by his remarks and criticisms. When Selma Lagerlöf received a literary prize for her *Gösta Berling's Saga*, Andrée was invited to the banquet given in her honour. The hostess asked him if he had read the book and received the reply: "No, but I have read Baron Münchhausen, and I suppose that is about the same thing." To the beauties of Nature, however, he showed himself highly receptive, and during his many balloon flights he greatly enjoyed the magnificent scenery he had the opportunity of viewing.

Once Andrée had set his mind or heart on an object, he devoted all his energies to its attainment. But before he came to a decision or marked out his goal, no one could weigh every consequence more ruthlessly, more critically than he. He never acted spontaneously, and there was wanting in him the spirit of fresh, impulsive action, but this was compensated for by the sense of security which is conveyed by the actions of an assured, discriminating man. He embodied in every respect the ancient phrase: "To speak once and stand by one's word is better than to speak a hundred times."

The reason why Andrée, a healthy, strong man in good circumstances, never married and had a family lay just in that fear of consequences which he could not foresee and control. "In married life, one has to deal with factors which cannot be arranged according to a plan. It is altogether too great a risk to bind oneself to a condition of things where another individual would be fully entitled—and what right should I have to repress this individuality?—*to demand the same place in my life that I myself occupied!*" But he has also said: "As soon as I feel any heart-leaves sprouting, I hasten to uproot them, for I know that any feeling which I allowed to live would become so strong that I should not *dare* to submit to it." At all events, when the polar expedition had been determined on, it so occupied his thoughts and emotions that there was no place for any other feeling.

Andrée, who was only sixteen when he lost his father, was always most tenderly attached to his mother. It was his mother who always received the first news of anything that concerned his success or failure. When he undertook his balloon flights, she expressed no word of apprehension, nor any wish that he should abandon them. When the first news came of the intended polar expedition, she felt the most natural fears, and they broke through the bars hitherto imposed by her will. But only one letter from her son was needed to make her once more his loyal comrade, the self-controlled participant of all that concerned him. In her last letter to him, in 1896, which was to be opened after the start of the *Virgo*—the boat which carried Andrée to Spitsbergen for his first attempt—she writes: "I am so dissatisfied with myself for having been such a poor, weak creature on that difficult day of leave-taking. But there is *one* thing I wish you to bear in mind, and that is this: if when you return I am no longer here, you must not be depressed by thinking that your grand enterprise has had the *least* influence on my having gone the way of all flesh. . . . And now, my thanks for all you have been to me! . . ."

The last words Andrée writes before he goes on board on that occasion are to his mother: "Don't be uneasy, dear, your heart is close beside me."

Mrs. Andrée died after a short illness, one month before the expedition sailed in 1897. She was spared the grief of a second parting.

Recalling Andrée's personality, we are most struck by his firmness of will. That was his central characteristic, but it was accompanied by uncommon energy and a lively imagination. The cold-blooded calmness and realism which distinguished him were not based on a cold temperament, but on his incessant exercise of self-control. Andrée enjoyed friendly intercourse with many, but he chose very few friends; to these, however, he was attached by unalterable loyalty and affection. In a circle of friends in which he found himself at home, he was playful and high-spirited. He was extremely fond of children, and liked to take part in their pranks and games in the families where he visited.

It has often been asked if Andrée was ambitious—in the less favourable sense. Yes, the young Andrée was ambitious, but all the personal vanity which may once have distinguished him was burned away by his knowledge of the serious nature of the journey that was to be made, and of the responsibility that lay on his shoulders for the lives of others. His ambition was transferred to the expedition and his comrades.

"Be careful of health, but not of life!"

"In my opinion, there is only one way in these times to retain a belief in idealistic efforts, and that is to undertake them oneself."

"The thing is so difficult that it is not worth while attempting it.—The thing is so difficult that I cannot help attempting it."

And then, finally, the words with which he began his memoranda at Dane Island, in 1896:

"If those who have the courage to do it were too good for the work, then who should do it?"

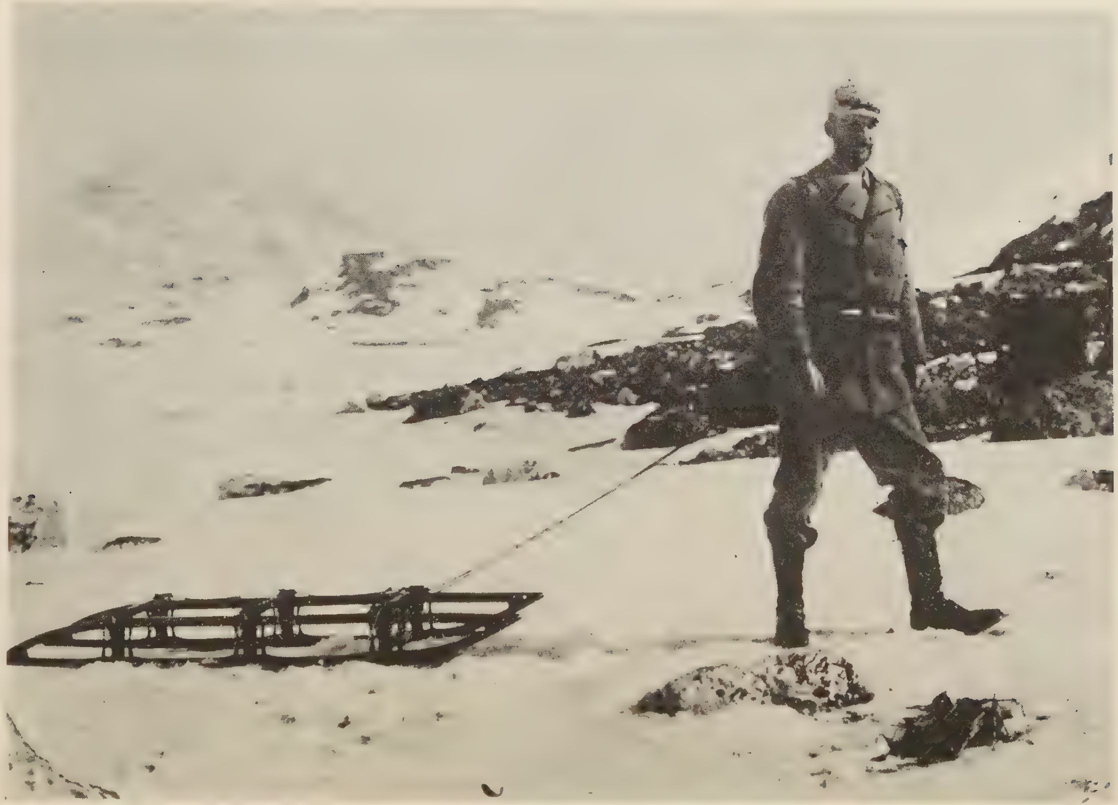
They give a picture of Andrée's attitude towards life and the living of it.

Nils Strindberg

Nils Strindberg was born in Stockholm on September 4, 1872. He was the son of Johan Oscar Strindberg, a wholesale merchant, and his wife, Rosalie Strindberg, *née* Lundgren. Both father and mother belonged to old Stockholm families. Of the members of the Strindberg family many devoted themselves to business, while several of them had literary and musical interests. The most celebrated person to bear this family name was the famous author and dramatist, August Strindberg (1849–1912).

When he was only six years old, Nils Strindberg began his

STRINDBERG AS A SCHOOLBOY



FRÆNKEL WITH ONE OF THE EXPEDITION'S SLEDGES studies at the Beskow School and, in 1882, he entered the Southern Technical Institute,[1] which then occupied the old Town Hall in the south of the city. He was very successful in his studies, always earned good marks, and sometimes very high ones, especially in scientific subjects. Physics and chemistry were his principal studies, and in his room at home he set up a laboratory, where he carried out many experiments. His health was always excellent and he kept it vigorous by participating in all the outdoor sports of that time.

He was quite musical, and learned at an early age to play the violin, an accomplishment which he pursued during the whole of his youth. At a later period he took part in the musical soirées given by the family.

On May 15, 1892, he passed his matriculation examination, gaining very good marks, and in the autumn of the same year he was enrolled among the students at the University of Stockholm. During 1892–1893, he studied at Upsala, where he took the degree of B.A. In 1893 and 1894 he spent his summers as a tutor in private families, and in the summer after, he was employed in some geodetic work in Norrland, in the north of Sweden. After this he was appointed assistant in physics at the University of Stockholm. He was no more than sixteen when he began to develop an interest in photography. He became in time a very clever photographer, experimenting successfully with various methods in the art. At an exhibition of amateur photographs, held at the Winter Palace in Stockholm, 1895, he won the first prize.

When, in 1895, Andrée brought forward his plan of travelling to the North Pole by means of a balloon, his intention was that the expedition should consist of three members. Dr. Nils Ekholm had already been engaged as the second man, and many persons applied for the third place, among them Strindberg, who was chosen. Andrée considered him, as a scientist, the best equipped of all the candidates.

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[1] Literally "the South Real School." The *real school* differs from the ordinary European *gymnasium* as an institute of technology differs from a Latin school.—*Trans.*

In order to qualify himself further for the balloon flight, Strindberg spent the spring of 1896 in Paris, where he pursued aeronautical studies and made six balloon ascents. On his return from Paris, he gave a lecture before the Swedish Society for Anthropology and Geography on April 24, in which he described his experiences as an aeronaut, and gave an account of the methods employed in the making of a balloon.

Strindberg's practical bent and all-round ability were much in demand during the course of preparatory work for the Polar Expedition. He was entrusted with the task of attending to the photographic equipment of the expedition, to which he contributed a very valuable addition in the form of a camera constructed in accordance with his own designs. As the cartographic work of the intended expedition was, to a great extent, to be based on photographs, the importance of this side of Strindberg's work is obvious.

But he also assisted in preparing the technical equipment in other branches. Among other things, he undertook extensive researches respecting the friction of the drag-lines, the gas-tightness of the balloon-cloth, etc. Together with Dr. Ekholm, he carried out a number of experiments respecting the buoyancy of the balloon. When, at Dane Island in 1896, the balloon had been filled with gas, and the expedition waited in vain for a favourable wind, it turned out that the silk was not so gas-tight as had been calculated. It is true that the researches on the tightness of the cloth carried out by Strindberg had been fully satisfactory, but it was through the seams that the gas streamed out, and when these leaks were closed, new ones were formed.

After the expedition had returned to Sweden in August, and Dr. Ekholm had resigned his position as a member, Strindberg was frequently exhorted to follow his example. He would not allow himself to be persuaded, however, for he considered that he ought to keep the promise he had given, even if the quality of the balloon was not quite satisfactory. He was sure that on the next occasion the journey would be successful, and that the participators would return unharmed, an opinion in which he showed his reliance by becoming engaged, in October 1896, to Miss Anna Charlier, a daughter of K. V. L. Charlier, Postmaster at Klippan in Scania.

In 1897 everything was in readiness to renew the attempt, Dr. Ekholm's place being taken by Knut Frænkel, C.E. None of those taking part in the expedition entertained any fears as to its success. One day when mention had been made of possible defects in the balloon, Strindberg said to Andrée: "The weather for the flight now is as good as we can ever hope to have, and, in spite of all repairs, the balloon will never be better than it is."

And when the moment for the start had come, he placed himself boldly by the side of Andrée and Frænkel in the car.

Knut Frænkel

Dr. Ekholm had withdrawn from further participation in Andrée's Polar Expedition for the reasons already mentioned. But, instead of trying to replace Dr. Ekholm by another scientist who would, to some extent, have Ekholm's qualifications, Andrée determined to choose a young sportsman, Knut Frænkel.

Knut Hjalmar Ferdinand Frænkel was born in Karlstad on February 14, 1870. He was the son of Lieutenant A. F. T. Frænkel, of the Corps of Royal Engineers, and of Laura Frænkel, *née* Löfgren.

Lieutenant Frænkel had a position in the construction work of the State Railways. This led to his being moved from one place to another, in accordance with the requirements of his work when new parts of the State Railway system were to be built. When Knut Frænkel was still a child, the family resided in Jämtland, and the scene round about, which offered every opportunity for a life in the open air, enticed him to forest and field, and it was here that he laid the foundation of a physique which became uncommonly strong and hardy.

Knut Frænkel was no bookworm, and the subject in which he most distinguished himself at school was gymnastics, in which, owing to his skill, he was allowed to join with the upper classes. His first instruction in ordinary subjects was given him by a tutor, but an eye-affection necessitated his studies being carried on with the greatest caution. In 1882, the family moved to Östersund, and Knut Frænkel became a pupil at the school there. Four years later he entered the higher secondary school at Hudiksvall.

Meanwhile he developed more and more into a powerful young man who loved adventure and feared no fatigue. The fells of the north of Sweden had a great attraction for him, and, for his climbing expeditions, he always chose those places most difficult of access and offering the best prospect of adventure.

Next to gymnastics, history was his favourite subject. He had a great admiration for Charles XII and studied military history with enthusiasm. Frænkel's interest in history gave birth to a warm and living love of country, and a royalism which sometimes found expression in a somewhat original way. On one occasion he wrote: "I read wild accounts of Charles XII and his Caroleans, and I shall soon believe that I am one myself." It is also related of him that once, when he was on a visit to Stockholm, a friend called on him, asking to be shown the town. The first thing he did was to go to Kungsträdgården Park and compel his friend to take off his hat before the statue of the hero-king.

In 1889 Frænkel came to Stockholm and there pursued his studies at the Palmgren Co-educational School. He was unsuccessful when he sat, in the spring of 1891, for his matriculation examination, in the Royal Institute of Technology, but a second attempt at Christmas, the same year, had happier results.

It had long been Frænkel's intention and hope to become an officer, but an operation for a nervous complaint which he was obliged to undergo had compelled him to change his plans, and to enter the Royal Institute at Stockholm in order to study for his father's profession. This was in 1892, and the following summer he was doing practical work as an apprentice at the railroad which was being constructed in upper Norrland. This practical instruction attracted him more than the theoretical—a feature characteristic of his personality. During his work on the railway-line he made himself much liked by his ability and his boldness.

In 1896 he passed his final examination as civil engineer at the Royal Institute, and afterwards took a course of instruction to train himself for entering the State Engineering Corps.

The experimental ascents made by Andrée in the balloon Svea, which were being carried out just about that time, greatly interested the young Frænkel. The boldness and enthusiasm characterizing these ascents awakened his lively admiration, and when Andrée published the plan of his polar flight, Frænkel was seized with a desire to form one of the party. In 1897 when a vacancy arose, he applied for the position. Andrée took a liking to the young man, this powerfully built, vigorous, and enthusiastic engineer, and Frænkel was chosen to occupy the post of third member in the expedition.

Like Strindberg, Frænkel, too, went to Paris to study balloon ascents, in the company of Lieutenant Svedenborg, who had been chosen as the alternate. During his stay in Paris, March–April 1897, Frænkel made seven balloon ascents, in the course of which he was exposed to many exciting adventures which, however, did not intimidate him.

When, together with Andrée and Strindberg, he stood ready to leave Dane Island, he did not doubt of the practicability of the plan. He, who had always been filled with a certain love of adventure, and who had always read with enthusiasm of the work carried out by great men, was now to have his longing for doing great deeds satisfied. His ambition, beneath which there were concealed no sordid aims, had now found its great goal, for which he was prepared to sacrifice even life itself.

II

Trial Flights in the Balloon Svea

Andrée's interest in aeronautics dates from the spring of 1876 when he was on a trip to America. He has himself related that during the journey he read a collection of popular lectures, *The Laws of the Winds*, by C. F. E. Björling. In this book his attention had been especially caught by the account of the trade winds, and it struck him that they might be considerably utilized for the purpose of propelling air balloons. He speaks with enthusiasm of this "magnificent, regular system of winds, which only waited for aerial vessels—giant balloons carrying cargo and passengers."

In America he visited a very well-known aeronaut named Wise, an elderly man who pursued this, at the time, not altogether harmless sport zealously and most successfully. Wise taught Andrée the first principles of the aeronautic art; he showed him how balloons were made and did everything he could to sustain the interest of the young Swede in aeronautics. On one occasion Wise offered to let Andrée make an ascent in company with another person. Andrée was quite pleased at receiving this invitation, especially as he was allowed to attend to the filling of the balloon with gas. There was no ascent, however, for an accident caused the balloon to burst, "and the gas went up in the air alone," as Andrée writes with regretful irony.

His next attempt, a few weeks later, gave the same negative result. On this occasion, financial difficulties were the cause, and several years were to elapse before he had the opportunity to enjoy the charm of flying in a balloon.

Meanwhile, he made exhaustive studies of balloons and aeronautics, and of other subjects which he imagined might be useful for balloon journeys.

In the spring of 1893 the Lars Hierta Foundation made Andrée a grant of money for the purchase of a balloon, which was supplied by the French aeronaut and balloon constructor, Gabriel Yon. This balloon, which had a volume of 37,230 cubic feet, was calculated to be able to rise about 9700 feet. It was christened "Svea" (Sweden).

With this balloon he made nine different ascents, of which he has given detailed accounts in Communications to the Royal Academy of Sciences.

When one reads these Communications one's greatest interest is aroused by the minute care with which Andrée prepares for every ascent, and by the manner in which he equips himself so as to be able to take observations in the most widely different spheres. They all show that he regarded aeronautics as strictly scientific work, and not as a form of sport, or as an expression of foolhardy love of adventure. With the assistance of various kinds of instruments he studied, among other things, the temperature and the humidity of the air at various heights, the character of the currents of air, the conditions attending rainfall, etc. Photographing from the air also occupied a great place in his studies, and to illustrate the richness of detail in his observations it may be mentioned that he carried with him a small mirror in which he studied his face, in order to observe possible alterations in the colour of the skin at various heights above the earth.

On July 15, 1893, at 3.34 a.m., the Svea rose with Andrée on board for the first time, the ascent being made from the barrack-yard of the Royal Engineers, in Stockholm. One of the first observations Andrée made respecting his balloon was that, on account of certain technical difficulties, twelve hours were required to fill it with gas.

During this first ascent, which lasted somewhat more than two and a half hours, he was carried about 26 miles and attained an altitude of 13,500 feet. At this height he heard distinctly dogs barking. During the descent he made the observation that, when the gas was allowed to escape partially from the balloon, the lower part of the bag was forced in by the pressure of the air, so that, in some degree, it acted as a parachute. At the end of the account of his first ascent Andrée makes a remark which is of peculiar interest, as casting a sudden sharp light on a detail of organization in the coming polar expedition. He writes:

"As regards the scientific observations it is a matter of course that, in many respects, more might have been accomplished had there been two persons in the car. The ideal number would, in fact, have been three, namely, one observer, one secretary, and one balloon expert."

By August 9 Andrée was ready to make his second ascent; this lasted nearly seven hours, in which time he traversed 60 miles and reached a height of 11,800 feet. On this occasion, too, twelve hours were needed to fill the balloon. His account of the journey, embracing detailed descriptions of the humidity and carbonic acid content of the air, of optical phenomena, of acoustic observations, etc., displays great familiarity with the manœuvring of the balloon at the same time that it shows his ability to acquire and utilize experiences quickly. The account also contains a description of the method employed for photographing from the air. Among other things he gives his views on the importance of aerial photography for map-making, and at the same time is able, with the help of one of his photographs, to correct an existing map. Respecting the movement of the balloon he observed several times that something caused it to rotate. This was especially the case when, on one occasion, he was rising rapidly. On descending, he was once more able to observe the parachute-like phenomenon noticed in the first journey. He also paid attention to the fact that the falling velocity of the balloon increased when it entered the shadow of a cloud.

The third balloon flight, undertaken on October 19, was extremely exciting and dangerous; the wind was so strong that it carried Andrée right across the Åland Sea, to the Finnish archipelago. It is true that, at the start, the wind was in the direction of the Baltic, but as Andrée considered it faint and as, in addition, he calculated on more favourable wind conditions when he came into higher air-strata, he determined to start. Like the former Communications, his account of this journey is full of observations on temperature, humidity, clouds, optical phenomena, etc., in addition to which there are studies on respiration and thirst at different heights.

When he had concluded his observations, he lost some altitude while beneath a cloud, and he found himself being driven across the Baltic by the wind. The Swedish mainland was fast dropping behind him, quite out of reach. He then determined to seek the assistance of a vessel towards which he was moving. In spite of the fact that the guide-rope was floating on the water, the balloon was going at a great speed, but Andrée succeeded in diminishing this by lowering the anchor. The speed was still too high, however, but he reduced it further by attaching two empty ballast-sacks to the end of the landing-line and allowing the latter to drag across the surface of the water. The sacks opened with their mouths towards the water, and offered considerable opposition to the onward movement.

It was Andrée's intention to get the steamer to catch one of the ropes of the balloon and in that way stop its further progress. But the captain of the vessel was evidently preparing to accomplish the rescue by laying his boat athwart the balloon's course, and catching it by the rigging or in some such way. Andrée understood the danger of such a manœuvre, of course, especially the risk to everyone concerned if the steamer's funnel came into the neighbourhood of the balloon. He was therefore obliged to refuse all assistance from the vessel, and to direct his efforts towards reaching land on the other side of the sea.

Now, as it was necessary to increase the speed of the balloon, he endeavoured to hoist up the landing-line with the sacks, but he was unable to lift it and so had to cut the line free. His speed increased and he approached Finland at the rate of about 18 miles per hour. He also tried in vain to hoist up his anchor, and found himself obliged to let it continue to drag through the water. He met a couple of vessels with which he exchanged greetings. At 3 p.m. he saw that he would have to increase his speed still more and so he cut the anchor free.

During this journey across the sea, Andrée noticed a curious movement of the balloon, namely, its repeated risings and sinkings. The explanation for this he finds in the circumstance that, with the diminution of the amount of gas, the balloon acted to some extent like a kite which is driven alternately upwards and downwards by the wind.

When we remember that the coming polar balloon flight was to be characterized by the employment of guide-lines, it is of great interest to note here how he summarizes his experiences of this Baltic voyage:

"I have dwelt on the circumstances because, as far as I know, this was the first time a systematic guide-roping over the water had taken place so that there was nothing to tell us how a balloon would act under such circumstances. The result is in the highest degree satisfactory, for it shows *that a guide-roping balloon of a suitable form can be supported by the same wind that drives it onwards,*[1] and this journey across the Baltic Sea has also shown in practice what might have been assumed from theory, namely, *that a guide-roping balloon, with the same use of ballast, can traverse greater distances than a free balloon of equal dimensions.*[1] I scarcely need point out of what extreme importance this is for the possibility of making long balloon flights for geographical purposes."

When describing his landing and rescue he emphasizes the fact that at the close he was prepared to sacrifice some of the heavier instruments in order to get the balloon to rise. Happily he was not obliged to do this. Towards the end, the darkness prevented him from making any time-determinations; he could, however, fix the time of his landing, as this took place with such great violence that his watch stopped, at 7.18 p.m. All the instruments were severely damaged and he lost a collection of photographs.

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[1] The italics are Andrée's. A "guide-roping balloon" signifies a balloon provided with drag- or guide-ropes.—*Trans.*

The landing took place on a lonely islet where, in his own words, he had to spend "an extremely unpleasant night." At eleven next morning his helpless position was observed and he was rescued.

During this journey the balloon had floated in the air ten and a half hours, and had travelled about 170 miles, during 120 miles of which he had been assisted by the guide-lines.

We have only a few observations to note respecting the fourth ascent, which was undertaken on February 26, 1894. Andrée had now moved his starting-place to Gothenburg, where he succeeded in filling his balloon in the short time of two and three-quarters hours. An unexpected gust of wind put the balloon, on rising, in danger of being thrown against a great pile of timber; this compelled Andrée to empty so much ballast that the balloon rose to a height of about 5500 feet before he found time to make his first temperature observation. During this flight the maximum altitude reached was 10,700 feet. When about to land, some 21 miles south of Jönköping, and after a journey of 89 miles, he attempted to check the movement of the balloon by means of the anchor, and then once more made the observation that any great resistance on the surface of the earth to the motion of the balloon caused the latter to deviate more or less from its main direction. When, at last, the anchor held, the balloon was damaged by a tree, and the gas began to pour out. In his Communication he writes:

"When I had assured myself that the balloon lay there safely, I made haste to go back to the buildings I had previously passed. There I met a woman and a boy who had locked themselves in, and they did not dare to come out before they were quite assured that I was an ordinary man."

The fifth ascension, on April 7, was connected with some experiments with a captive balloon, "in order to discover to what degree a captive balloon is suitable as an observatory for meteorological investigations, etc."

During his journey on this occasion, Andrée attained his greatest altitude, 14,250 feet. When at the height of 13,000 feet, he experienced headache for the first time, in addition to which "the beating of the pulse produced a faint singing noise on the left side of my skull."

The sixth ascent was undertaken on July 14, and the Communication reveals a novelty which once more carries the reader's thoughts to the polar flight. This time Andrée dealt with the problem of the dirigibility of the balloon, and he gave a very detailed description of the method employed for the purpose. He based his theory on the Baltic Sea experience, when he had found that the guide-line could compel the balloon to make fairly large lateral movements.

For the purpose of steering the balloon he attached to it three new details, first a guide-line in three sections so arranged that, without fastening to any objects, it would be able to drag along the ground and reduce the speed of the balloon. In addition there were a steering-sail, and an arrangement which enabled him to alter the position of this sail with respect to the wind. Andrée had the satisfaction of being able to state that the balloon proved "steerable to a high degree," as he expresses himself. In some of the trials, the deviation from the main direction amounted to 30°; he concludes his account of the experiment with the following words:

"It seems to me, therefore, that this journey, together with that across the Baltic, fully prove the feasibility, first, of making extensive voyages over both land and sea by means of large and suitably shaped balloons provided with sails and guide-lines, and also of then being able to control the movements of the balloon, so that the traveller will not be entirely dependent on the wind but will, to a considerable degree, be able to follow the route he wishes."

During this trip, Andrée threw down so-called balloon-cards, which were afterwards to be sent to him by the finders, and on which notes should be made respecting the place where they had been found, so that it would be possible to ascertain the route followed by the balloon.

The account Andrée gives of his seventh balloon ascent (on August 4) is very brief, and embraces, in addition to descriptions of the clouds, temperatures, and winds, a comparison with similar balloon ascensions in Germany and Russia.

The eighth ascent (on November 29) is remarkable in two respects. First of all, it was a record flight, Andrée, in three and three-quarters hours, traversing the route between Gothenburg and Gottland, a distance of 240 miles. Secondly, in order to land he employed a newly invented, so-called "bursting apparatus" (rip-valves), with which he could empty his balloon of gas in one or two minutes. By means of this arrangement he succeeded in stopping his balloon at the place he himself wished instead of, as so many times before, being dragged for long distances at the risk of injury both to himself and to the balloon.

Andrée made his last ascent with the Svea on March 17, 1895. This journey once more enabled him to make tests with his balloon-cards, which proved to be of great importance in determining the route that the balloon had taken.

During the course of these nine balloon journeys, Andrée carried out extensive scientific investigations. The number of observations made amounts to more than four hundred, and in a total of forty hours in the air he had been carried a distance of more than 900 miles. When we take into consideration that he was alone during these flights and that, consequently, he was both navigator and observer, we shall undoubtedly agree with one of his biographers who says that "Andrée, in this respect, had made a hitherto unheard-of world record."

III

Planning the Polar Flight

On the evening of March 16, 1894, after a meeting of the Swedish Anthropological and Geographical Society, Baron A. E. Nordenskiöld turned to Andrée and asked him to accompany him for some distance on his way homewards as he wished to discuss a matter which ought to interest both of them. So they went out into the evening mist, and walked up Drottninggatan towards Nordenskiöld's home in the old buildings of the Academy of Sciences, near Adolf Fredrik's Church.

Andrée experienced lively emotion at this request of the renowned polar explorer, the discoverer of the North-East Passage, the man who, on board the *Vega* had circumnavigated Europe and Asia. It seemed clear that the old polar veteran meant to speak to him about the utilization of balloons on Arctic expeditions, for what else could he have to speak about with Andrée?

Nordenskiöld said that he had many times pondered over the possibility of employing captive balloons in the service of polar investigation, for the purpose of making observations, laying down maps, etc. At the moment he was himself interested in an expedition to the South Polar regions and had thought especially of the possibility of surmounting, with the aid of a captive balloon, the ice-barrier surrounding a great part of the Antarctic continent, that most mysterious of all quarters of the globe.

After they had discussed Nordenskiöld's plans long and thoroughly, Andrée spoke of his idea of making an expedition over the polar ice in a free balloon. Nordenskiöld listened with fixed attention, and at last broke out with:

"Well, that does not sound at all bad; continue working at the plan and count on me when you have something really ready."

That evening saw the birth of the Andrée polar project. What had previously been only a daring hope ripened in the sun of the encouragement given by the celebrated Arctic explorer, and became a fixed determination.

Just at that time Andrée was in the midst of his experimental journeys with the balloon Svea, and he now attacked a problem which specially interested him, namely, making a balloon dirigible, that is, capable of being steered, by means of drag- or guide-lines and sails.

Since air-currents, as a rule, move in spiral paths, a free balloon always risks being carried back almost to its starting-point. On the other hand, a balloon which had dirigibility, even to the extent of only a few degrees, could cut obliquely across an air-current and could thus traverse a given region in a substantially shorter time than that required by a balloon which could not be steered.

These steering experiments gave results which surpassed considerably Andrée's expectations, and during his balloon journey from Gothenburg to Gottland he had an opportunity to demonstrate what aeronautics could do as regards speed and safety. At the exhortation of Nordenskiöld, Andrée made public for the first time his plan of a polar expedition by balloon before a meeting of the Academy of Sciences, on February 13, 1895, and two days later he gave what was essentially the same account in the presence of the Swedish Anthropological and Geographical Society.

In his introduction to this lecture Andrée points out the peculiar difficulties which meet explorers in penetrating the ice-filled Polar Sea. The attempts made to penetrate the central parts of the Arctic Ocean by means of vessels had hitherto been without result. Andrée, it is true, mentions the ingenious attempt then being made by Nansen to drift, in a stoutly built vessel, with the slow-moving currents of ice right across the Polar Sea, but he points out that up to the present, no knowledge had been gained concerning the success of this new method of research.

The only means of travel across the pack-ice towards the North Pole was really the sledge, but even the repeated attempts that had been made with this method of transport had met with very scant success.

He continues:

"Has not the time come to revise this question from the very beginning and to see if we do not possibly possess any other means than the sledge for crossing these tracts? Yes, the time for doing so has certainly come, and we need not search very long before we find a means which is, as it were, created just for such a purpose. This means is the air balloon; not the dreamed-of, perfectly dirigible air balloon, so devoutly longed for, since we have not yet seen it, but the air balloon which we already possess and which is regarded so unfavourably merely because attention is focussed on its weak point. Such an air balloon is, however, capable of carrying the explorer to the Pole and home again in safety; with such a balloon the journey across the waste of ice *can* be carried out.

"These words may seem bold, and even reckless, but I ask you to suspend your judgment on the matter until you have heard my arguments. For I am assured that then your judgment will be different. We have merely to rid ourselves of preconceived opinions and then allow facts to have all the weight they may possess.

"I wish, first and foremost, to emphasize the fact that the problem of reaching the Pole, or of traversing the Arctic wastes of ice in general, is not a purely scientific problem, but also a technical one. It is true that the result we wish to obtain is of importance first of all to natural science, but the discovery of the means by which this result is to be gained is, in its very nature, a task for the technologist. Since there have proven to be difficulties of a certain character, and since it has also been shown that these difficulties cannot be overcome by the technical means which have hitherto been at our disposal, then it is to the technologist that we should turn to ask if he is able to give us some better means by which these difficulties can be surmounted. Hitherto he has been unable to answer this question in the affirmative, but if we now address the same question to a balloon-technician, he will, undoubtedly, after hearing the indispensable conditions that are to be fulfilled, give us a reassuring answer.

"These conditions seem to me to be the following: 1. The balloon must possess carrying-power sufficient to sustain the weight of three persons, all the instruments necessary for carrying out observations, provisions, etc., for four months, and ballast, all of which together may be calculated as weighing about 6600 pounds. 2. The balloon must be so gas-tight that it can remain floating in the air for a period of thirty days. 3. The filling of the balloon with gas must take place in the polar tracts. 4. The balloon must, to some degree, be dirigible."

As regards the first three conditions, Andrée was able to refer to the general aeronautic experience at the time when he brought forward his proposal.

He pointed out, for example, that for the Paris Exhibition, 1878, there had been made a balloon 117 feet in diameter and with a capacity of 865,000 cubic feet, in which visitors had made ascents. When this balloon was filled with hydrogen, it had a clear carrying capacity of 28,800 pounds, i.e., four times the weight now calculated for the polar balloon. The Paris balloon made 1500 ascents, carrying on each occasion from thirty to forty passengers.

Respecting the second condition, there could also be made satisfactory comparisons which showed that a balloon of the calculated size of the polar balloon would not lose more than 110 pounds of its carrying-power over a period of thirty days—an assumption which Andrée's experience during the subsequent polar journey was far from confirming.

The filling of the balloon with gas could very well take place in the polar regions, as the requirements of military balloons had led to the construction of transportable hydrogen-gas apparatus, by means of which a balloon of the size of Andrée's could be filled with gas in the space of thirty to forty hours. And, moreover, hydrogen could very well be conveyed to the starting-point in a compressed form in steel cylinders.

With regard to the fourth and last condition, namely, the relative dirigibility of the balloon, Andrée had merely to direct attention to the experiment carried out on the trial journey of the balloon Svea on July 14, 1894. (See preceding chapter.) By providing the balloon with an adjustable sail and with drag- or guide-lines, Andrée had succeeded on this occasion in making the balloon deviate about 27° from the direction of the wind. Now and then this deviation had amounted to as much as 40°. "It may be thought that a deviation of 27° is not of much value, but the following consideration will show that, in reality, it is of rather great importance, especially in the case of balloon flights for long distances. Let us suppose, for example, that the balloon is sailing with the wind blowing direct from Gothenburg to Stockholm. If the balloon has no steering apparatus, it cannot, of course, do anything else but follow the line uniting these two cities. But if the balloon has a steering arrangement by means of which it can be made to deviate 27° from the direction of the wind, then, under the same wind conditions as those just mentioned, it can be steered from Gothenburg to any point at all on the east coast between Västervik and Söderhamn."

In his lecture, Andrée mentions the details of the technical equipment of the balloon expedition as follows:

"The balloon must be of double silk and have a volume of 212,000 cubic feet and be filled with hydrogen. It shall be provided with a system of sails and with several drag- or guide-ropes, all of which must be made of impregnated coco-nut fibre, so that they can float on the water; then the balloon will retain the same height above the water as it will over ice or land. In addition it must be provided with a large number of freely hanging, heavy ropes—ballast-lines—which shall serve partly as ordinary ballast and partly as automatic life-saving apparatus in the event of an unexpected descent to a very low height. Such a movement as this may happen as a consequence of a fall in the temperature of the gas or from some other cause, e.g., a strong gust of wind directed downwards. When, consequently, the lower parts of these ballast-lines sink on to the surface of the land, the balloon will be relieved of a corresponding weight and the fall of the balloon will stop before the car comes into contact with the surface. All the ballast-lines are to be provided with numbers marked on metal plates attached to them, and the time and place when any rope is cast loose should be carefully noted, so that, if the ropes are afterwards found, information may thus be obtained respecting the movements of the ocean currents and the ice fields.

"The bearing-ring should be provided with a floor and railings, so that it can be used for manœuvring and observation.

"The gondola should be very capacious, containing a dark-room for photographic purposes; it should be warmly lined and contain berths for three persons. Its roof should be arranged as a place for observation and, like the bearing-ring, should have a railing. In addition the gondola should be provided with buoys, and should be suspended in such a way as to be rapidly—preferably by a single manipulation—released from the balloon if necessary, so that the aeronauts may be able to take refuge in the sea by descending to the surface of the water when a vessel is in the neighbourhood and then, if the wind be strong, release themselves from the balloon.

"The equipment should also include sledges, a canvas boat, tent, arms and ammunition, and provision for four months—all this so as to make it possible for the voyagers to save themselves should anything happen to the balloon.

"But I wish to emphasize expressly the point that the expedition must not be equipped in such a way as to deprive it of its character of a *balloon expedition,* for the journey is to be carried out by *balloon,* and the travellers are to rely on the *balloon;* the life-saving apparatus, consequently, is to have no other purpose than those of life-boats and buoys on board a ship."

With regard to the development since Andrée's death of map-making by means of aerial photography it deserves to be noted that in this sphere, too, he was a pioneer, for he says:

"It is not possible, during such a rapid journey as one usually makes by balloon, to map out correctly in the ordinary way, the tracts that are crossed. The mapping-out can only be done by photography, and this system must then be employed on a rather large scale. . . .

"As shown by the following estimate, the expenses of the entire expedition need not amount to more than about $34,500.

Balloon, 212,000 cubic feet, with car, steering apparatus, landing apparatus, etc.		$9,650
Balloon-house with canvas walls		4,000
Gas production:		
Hydrogen apparatus for 5300 cubic feet per hour	1,950	
Raw material, zinc and sulphuric acid (with calculated loss of 20%)	3,000	
		4,950
Instruments:		
Photographic equipment (2 apparatus and 3000 plates, etc.)	950	
Other instruments, charts, maps, etc.	1,300	
		2,250
Provisions, electric batteries, sledges, etc.		1,350
Transport		6,700
Technical expert for gas production and filling		1,600
Other, unforeseen expenses		4,000
Total		34,500

"The main object of the expedition shall be to explore as much as possible of the North Polar region geographically.

"The expedition is to leave Europe in the early summer, 1896, at such a time that it can arrive at the Norwegian Islands in the middle of June. These are situated near the north-west point of Spitsbergen. The balloon-house shall be erected on one of these islands, or at some other suitable place, and there the filling of the balloon and the other preparations will take place, so that only a couple of hours will be necessary to make all clear for the start.

"The weight of the balloon must be so balanced that when the balloon is free it will stay at a mean height of about 800 feet above the surface of the earth, that is, *below* the lowest region of clouds, but *above* the mists at the surface of the earth.

"The start will take place in the month of July as soon as the weather is favourable, that is, at a moment when the air is sufficiently clear and when there is a fresh southerly or almost southerly wind blowing. Such a wind should be one of the chief conditions enabling the balloon to penetrate as quickly as possible far into the unknown regions, and in the direction of the Pole. This being a point of main importance for the success of the expedition, the greatest attention should be devoted from the beginning of the journey to the effect the guide-lines and the steering apparatus will have on the movements of the balloon, and in manœuvring, nothing must be omitted that can promote the approach of the balloon to the Pole.

"How soon the Pole can be reached depends, of course, on the velocity and direction of the wind. Under favourable conditions it can be done in a very short time. With a wind-velocity like that which, on November 25, 1870, carried a French balloon from Paris to Livfjeld in Norway, and that which on November 29, 1894, carried my balloon from Gothenburg to Gottland, there would be required about ten hours for the journey to the Pole. If, on the other hand, the balloon does not move at a greater speed than 16.5 miles per hour, which is the speed that can be obtained with the average wind-velocity at a height of 800 feet above the surface of the earth, then about 43 hours would be needed for a journey from Spitsbergen to the Pole.

"A moderate speed would be better than a great one, inasmuch as, with the former, a greater number of observations can be taken and with more exactness than in the latter instance.

"If the journey lasts thirty days, then, according to the above calculation of the probable average speed of the balloon, it will cover a distance of about 11,800 miles. The journey from Spitsbergen across the Pole direct to the Bering Straits—a distance of 2200 miles—will not take more than six days, i.e., one-fifth of the time during which the balloon can remain in the air."

Continuing his lecture, Andrée points out that the physical features of the polar districts present, in many respects, special advantages for travelling through the air in the summer-time.

"The continuous sunshine is also of service to aeronauts as it maintains the temperature of the balloon and air at an extremely equable level, so that there will be little alteration in the carrying-power of the balloon. The lowest temperature observed at Cape Thordsen in Spitsbergen during July 1884 amounted to 33.4° F. and the highest was 52.9° F. The lowest mean temperature of any day in July was 36° F., and the highest was 46.8° F. In these tracts, consequently, the daily variation of temperature at that time of the year is quite inconsiderable, and so the movements of the polar balloon will not be disturbed by great changes of temperature.

"Is is of no less importance that the rainfall [1] in the Arctic tracts is almost negligible. Someone has remarked that an expedition such as this could be annihilated by a single snowfall which weighted the balloon with, for example, 55 pounds of snow per square yard and that for this reason a balloon flight in the polar regions would have little prospect of success. Well, it would, undoubtedly, be very dangerous to have the balloon weighed down to such an extent by snow. But from the observations of the Swedish Spitsbergen Expedition it is to be seen that this will not happen, for not even the *sum* of the rainfall during June, July, and August amounts to 55 pounds per square yard, and the total rainfall for the month of July, when the journey should be made, does not amount to more than 12.6 pounds per square yard. If in addition we consider that the snow which falls at temperatures above 32° F. soon melts, and that that which falls at temperatures below 32° F. will blow away (for the balloon will not move as quickly as the wind) and that, finally, the snow or ice which may possibly gather on the balloon will be exposed to evaporation, which, in these regions and at this period of the year, removes from two to three times as much moisture as falls, then we can easily see that the rainfall conditions are very favourable and by no means constitute a hindrance to a balloon flight in the polar tracts."

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[1] Rain, snow, etc.—*Trans.*

Finally, Andrée emphasized the fact that, although it was true that no balloon journey as lengthy as the one he now proposed had been carried out before, instances were not wanting of balloon flights which lasted several days. In France, for instance, two distinguished aeronauts, Wilfred de Fonvielle and Maurice Mallet, had undertaken a five days' journey with a balloon of approximately the same size as Andrée's Svea. They travelled only during the daytime; in the evenings they landed at some village or town, anchored their balloon, placed guards, and then went to the nearest hotel, where they spent the night.

Summing up his statements, the lecturer considered "that it is not only possible to carry out a balloon journey across the polar tracts, but that there is very much in favour of making an effort to do so." The attempt to penetrate to the Pole by means of vessels or sledges had hitherto resulted in little progress. "Every minute of latitude conquered by the means hitherto used will probably cost thousands in money and make great demands on human life. . . .

"Is it not then more probable that we shall succeed in sailing to the Pole with a good balloon than that we shall be able to reach it with sledges as our means of transport or with vessels which are carried like erratic blocks, frozen fast to wandering masses of ice? Yes, I am certain that it will be justly acknowledged that we have far greater prospects of penetrating into polar tracts by means of a balloon than in any other way. It cannot be denied but that, by means of a single balloon journey, we shall be able to gain a greater knowledge of the geography of the Arctic regions than can be obtained in centuries by any other way.

"And who, I ask, are better qualified to make such an attempt than we Swedes? As a highly civilized nation, characterized for ages by the most dauntless courage, dwelling in the neighbourhood of the polar regions, familiar with its climatic peculiarities, and by Nature herself trained to endure them, we can hardly altogether help feeling that we have a certain obligation in this matter. And this so much the more in that we have to maintain the best traditions in the field of natural science in general, and, not least, in that of polar research in particular, and that we have in our midst, not only old experienced men who have done great deeds in those regions, but also a whole band of young and determined men who have already dwelt and laboured there, and among whom there would be little difficulty in enlisting comrades for such an expedition. Are we not, therefore, called upon, before other nations, as being best fitted, to execute this great task? And I believe I am not mistaken in thinking that, just as we hope and expect that the peoples of Central and Southern Europe will explore Africa, so they, too, expect of us that we shall explore this white quarter of the globe!"

The plan thus put forward was more favourably received by the public than Andrée had ventured to hope. For this result he had to thank, in the first place, A. E. Nordenskiöld, who, at the meeting of the Academy of Science, laid the authoritative weight of his words on the scale in behalf of the proposal. He gave his full and unconditional approval to it, and summed up his opinion in the following words: "It is a long time since I have embraced a proposal for a polar expedition with real enthusiasm, but I do so on this occasion. . . ."

It is only justice to recall that Andrée's aeronautic plans, from their very first publication, met with the liveliest interest and effective support on the part of many of the leading men in the scientific world of Sweden at that period. G. R. Dahlander the physicist, for instance, Andrée's teacher and friend, had favoured his plans from the very first. Professor Gustaf Retzius, the celebrated anatomist and anthropologist, certainly the most influential man among naturalists in Stockholm, had, through the Foundation "Lars Hiertas Minne," richly supported Andrée, not only when he undertook his experimental flights with the balloon Svea, but also when he first worked out his polar plan. After this plan had become known through the lecture at the Academy of Science on February 13, 1895, another celebrated scientist of that period, Professor Mittag-Leffler, took steps to induce the French Academy of Science to discuss the question of the balloon expedition and to appoint a Committee to investigate the matter. The result was that the Committee issued a report on the whole favourable.

Andrée's plan also awakened good will and interest in other circles abroad. Thus, for example, it gained the good will of Dr. O. Baschin, meteorologist at the Meteorological Institute in Berlin, and himself an aeronaut.

On the other hand, there was heard not a little criticism of the undertaking, appearing frequently in the form of satire. A "prominent scientist who had also made a practical study of the art of navigation" considered that, in the neighbourhood of the Pole, it would be impossible to determine one's geographical position! Other prophets of evil predicted that birds would peck holes in the balloon, that the travellers would be shot by savages, that they would freeze to death amid the unheard-of cold around the Pole, or be suffocated in the attenuated atmosphere.

In one Austrian newspaper its readers were told: "*Jener Herr Andrée, der mittelst Luftballon zum Nordpol und zurück fahren will, ist einfach ein Narr oder ein Schwindler.*" (This Mr. Andrée, who wishes to go to the North Pole and back by means of an air balloon, is simply a fool or a swindler.)

After the February lectures in the Academy of Science and in the Geographical Society, Andrée's polar plan stood revealed to the public, but without the financial means necessary for its realization. Then there occurred a very dramatic and, for him, extremely fortunate incident. On May 10 there came into his office in the Royal Patent Department, Alfred Nobel, the inventor of dynamite and afterwards, by his last will, the founder of the Nobel Prizes. Eight years earlier this original man had had a great debate with Andrée, during which, for the space of three hours they discussed everything between heaven and earth and found that they held different opinions on almost every subject. They had then parted with a hearty handshake. Now Nobel appeared, with a gleam in his eye, and asked whether Andrée recognized him. The latter answered that he remembered their former discussion very well indeed and that he was ready to continue from the point where they had left off. But Nobel said he had come on a very different errand. He had read about the proposed polar expedition and wished to contribute a sum of money towards its realization. His gift of 20,000 kronor ($5350) made him the first donor towards the polar expedition.

A week later Nobel learned that money was coming in very slowly, and so he increased his gift to $17,400, i.e., to one-half of the calculated cost, on condition that the other half was contributed within two months.

Nobel's extreme munificence changed the situation altogether, Andrée then applied to King Oscar, who offered him a sum of $8000, and a few days later Baron Oscar Dickson gave him an equal amount. On June 4 the sum necessary for the expedition was fully covered, by Professor and Mrs. Gustaf Retzius donating the $1400 still required.

On July 29 Andrée gave an account of his intended expedition before the International Geographical Congress in London. During the discussion that followed, there were many prominent speakers, among them the Arctic explorers, Admiral Markham and General Greely, who opposed the plan, but at last Andrée found an excellent advocate in Colonel Watson, the former chief of the English Military Aeronautic Corps. Colonel Watson considered that a balloon could very well keep in the air for a considerable period during an Arctic summer journey, which would be favoured by the slightness of the variations in temperature and by the constant daylight.

"Everything," said Colonel Watson, "depends on the balloon being kept at a comparatively constant height; this can be done by means of drag-ropes and ballast-lines.

"It is clear that the attempt will be accompanied by considerable risk and no one knows that better than Mr. Andrée himself; but there are many risky expeditions that are worth the undertaking. It may happen, of course, that Mr. Andrée will never come back, but in spite of that risk the attempt ought to be made."

The travels that Andrée undertook for the purpose of studying the problem, together with his visit to the Geographical Congress in London, made his polar plan known abroad and removed many false ideas concerning it. At the same time Andrée acquired a perfect knowledge of the technical resources of the balloon, as far as they then extended, and he also had an opportunity to discuss the details of his equipment with the principal experts in the sphere of aeronautics.

During the course of these studies abroad Andrée seized the opportunity to request balloon manufacturers of any note to send him samples of the material they thought most suitable for his polar balloon. Five factories replied, and the samples of material they sent in were subjected to comprehensive tests respecting tightness, tensile strength, elasticity, weight, absorption of water, etc. These tests, the greater part of which were carried out by Nils Strindberg, were decided in favour of Henri Lachambre, the French aeronaut and balloon manufacturer, with whom an agreement was signed on December 24, 1895, for the delivery of the polar balloon.

IV

The First Visit to Spitsbergen

Andrée's first journey to Spitsbergen with the project of flying to the Pole began in Gothenburg on the morning of June 7, 1896, when the expedition's ship, the freighter *Virgo,* glided out of the harbour amid jubilant cheers.

The *Virgo* had a crew of thirty men under the command of Captain H. Zachau. The members of the balloon expedition were: S. A. Andrée, Chief Engineer at the Patent Office and leader of the expedition; Dr. Nils Ekholm, Assistant Director at the Meteorological Institute of Stockholm, the meteorologist and astronomer of the expedition and the former chief of the Physical-Meteorological Station at Cape Thordsen, where Andrée had also been stationed; and Nils Strindberg, physicist and assistant technologist. Strindberg, an extremely clever photographer had constructed an ingenious camera for use during the expedition, for which he had procured the photographic equipment.

The balloonist Henri Lachambre, who had supplied the balloon, and two carpenters who were to erect the proposed balloon-house at Spitsbergen, were also on board. The medical man of the party was Dr. C. Ekelund. In addition, there were Professor Svante Arrhenius, the celebrated chemist, who took the post of hydrographer for the sake of a summer in the Arctic regions, and G. Grönberg, the zoologist of the company.

The ship was joined at Tromsö by a geological party consisting of Gerhard de Geer, State geologist, and Lieutenant O. von Knorring, who had been invited by Andrée to go to Spitsbergen on the *Virgo.*

The voyage to Spitsbergen was at first favoured with fine weather and ice-free water, but off Horn Sound they encountered floes, which necessitated several changes of their course, and greatly delayed their progress northwards. It was not until June 20 that they reached Isfjorden, where a short halt was made and where the geological party disembarked. When they went on again the passage grew better; they met no ice worth mentioning, and on June 21 the *Virgo* anchored in the strait between the two Norwegian Islands.

They had now reached their destination, and the very next day the three members of the intended balloon flight reconnoitred for seven hours to find a suitable site for the balloon-house. During the course of this search, both Norwegian Islands were inspected, but Amsterdam Island was found to be not very suitable. Finally, on the north side of Dane Island, they discovered some hollows, open towards the north but otherwise well protected. One of these was chosen as the starting-point, as its position seemed to satisfy all their needs. Besides this, close to the place stood a house which had been built by one Arnold Pike, an Englishman, who had given permission for its use. Andrée writes as follows about the advantages of this site as compared with others:

"The ground is firm, free from snow, and dry. The place intended for the balloon-house lies close by the shore so that there will be hardly any transporting of timber necessary. Farther along the beach, the land lies lower. If the hydrogen-gas apparatus is erected there the gas will at once flow easily into the balloon. The place is surrounded by heights on all sides except the one towards which the start will be made. Thus the balloon-house does not run the least risk of being exposed to strong pressure from the wind. In the neighbouring bay, the ship is protected against every wind and current, and against pressure from the ice. The depth is not so very great but it is sufficient to allow the ship to be moored so near the shore that the unloading can take place with comparative ease."

On June 23, the *Virgo* was very carefully brought into Dane

Hole, where it anchored about 160 yards from the shore near Pike's House, and the unloading began at once.

From June 25 to 28, the hydrogen-gas apparatus was carried ashore and this was followed on June 30 by the balloon, which was in a very good condition. The chemical treatment of the ballast-lines was at once begun. The work of erecting the balloon-house, which had gone on slowly while the ship was being unloaded, now made rapid progress, and by July 1 it was up to the first floor. On the fifth the car was unpacked and was also found to be in good shape.

Then the second story of the balloon-house was begun and the chief parts of the gas apparatus were placed in position. The period between July 8 and 11 saw the completion of the second and third stories and the commencement of the fourth. The guys for the house were anchored, some in the rock and others to large stones embedded in the ground.

Andrée's diary here contains the following memoranda:

"When I had finished my watch at two o'clock last night (July 11–12), I went on shore to sleep in the car. I had the sleeping-sack for bolster, and the blankets as a covering. There was a fresh wind blowing and the car was arranged so that it could sway a little with the wind. I had with me the first part of the *Journey of the 'Vega',* and read a few pages, afterwards placing the book on the book-shelf which had been newly set up. In this way I consecrated, as well as I could, the new vessel."

Then came a tourist steamer, the *Express,* which was obliged to stay until July 17 on account of a storm. On the thirteenth the men began to lay the floor of the balloon-house, which during the heavy winds of the last few nights had shown that it could stand the strain. The balcony of the house was put up, and the two spars for the top wire erected. It turned out that an alteration had to be made in the car, the makers not having followed the drawings. The hydrogen-gas apparatus was now practically ready and a friction test of the drag-lines was carried out by a little steam-launch. The test showed that, with water-friction, these guide-ropes were able to reduce the rate of speed by some 50 per cent.

A trial balloon, filled with hydrogen from a special gas apparatus, the property of the University of Stockholm, was christened "Sverige" [1] and sent up amid cheers. As it rose straight up into the clouds, its final direction could not be watched. In the evening of the nineteenth they practised splicing, tying knots, etc., "so we won't be too clumsy in such things," writes Andrée. The next day the balloon was taken out of the balloon-box, and a thorough examination proved it to be intact.

On the twenty-first, the balloon was spread out and the valves put in their places; this, however, occasioned some difficulties as they had not been made in accordance with specifications. After some adjustments, however, they were made to function. The next day began with a heavy snowfall which left everything wet through. At two o'clock on the twenty-third, they began to inflate the balloon. The gas apparatus worked perfectly. A thorough sampling of the reserve supplies gave good results.

On July 24 and 26 two tourist steamers came, the *Erling Jarl* and the *Express* again, both of them bringing mail. At four o'clock on the twenty-seventh, the balloon was completely inflated, one of the most difficult and important parts of the work. Then they began packing the provisions and instruments into the car, and fixed the steering device in place. A fault was detected in this which made it necessary to use a reserve steering mechanism instead of the one intended.

During the first days of August the expedition waited in vain for a suitable wind. Everything was ready for the start, the preparatory work had been carried out without any very great difficulty; one goal, long wished for, had been reached and the only thing wanting was a wind that could carry the balloon to the Pole.

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[1] Sweden.—*Trans.*

"Everything has turned out exceedingly well and according to our wishes," writes Andrée, "so that, if Nature will only do its share, we would soon be all set."

According to the agreement made with the owners of the *Virgo*, the vessel was not to be kept at Spitsbergen after August 20, and the conditions of its insurance did not permit a longer stay. With these facts before him, Andrée writes on August 4:

"Last night, however, I was obliged to face the thought that we may not be able to start this year. Zachau cannot wait after the twentieth or the ship will lose its insurance. We must therefore begin getting things on board again on the fourteenth. And Ekholm thinks, too, that we can't make the flight any later than that."

On the morning of August 14 a vessel entered Virgo harbour. Andrée and his men recognized it at once and, amid cheers, rowed out to the ship to greet those on board.

It was the *Fram,* Fridtjof Nansen's celebrated vessel, now on its way home after a unique voyage across the Polar Sea. With a crew of ten men under the command of Captain Otto Sverdrup and with Nansen's leadership, the *Fram* had left Christiania on June 24, 1893, to carry out the latter's amazing plan of first freezing fast in the ice, and then drifting with it right across the Polar Sea.

All was well on board, but two men were wanting, namely, Nansen and Lieutenant F. H. Johansen. To their astonishment Andrée's men heard that, after the *Fram* had drifted with the ice about a year and a half, Nansen and Johansen had left the vessel on March 14, 1895, to make their way farther north on skis and, if possible, thus reach the North Pole while the ship continued its journey with the ice.

Now the *Fram* had happily returned, but where were the two men? The joy felt at the successful journey across the Polar Sea was troubled by the uneasiness felt for the fate of the two bold men. The riddle was solved when, on August 21, the *Fram* put into Skjærvö in Norway and there met their chief and Johansen, who had reached the Norwegian mainland as early as the thirteenth of the same month.

During the period August 6–14, Andrée's meteorological journal bears witness that the wind-conditions made any thought of an ascent during that time impossible. And on the fifteenth Andrée notes in his diary: "Today we have ground the shears with which the balloon is to be cut open."

The next day, eight carrier-pigeons were released, with a dispatch stating that the thought of starting that year had been definitely abandoned. On August 17, the balloon was emptied of gas, and on the twentieth the *Virgo* lifted anchor and began the voyage home.

Andrée's first attempt to realize his proud aeronautic plan had consequently been unsuccessful. The reason is not far to seek: he started too late in the summer. He was not ready for the ascension before about August 1, i.e., almost three weeks later than the day when he began his journey in 1897. In an article in *Ymer*, 1895, Dr. Nils Ekholm has pointed out that from the point of view of weather the month of August is less favourable than July. The time factor also hindered him because of the insurance on the *Virgo*, allowing him only three weeks in which to wait for a favourable wind.

The result of all this was that no ascent was made, a fact that Andrée himself was the first to deplore. But he did not allow himself to be depressed by this reverse; he merely put off his plan until the following year, and on his return to Sweden resumed his position as Chief Engineer at the Patent Office.

V

The Base on Dane Island

For Andrée's second journey to Spitsbergen the Swedish Government had placed the gunboat *Svensksund* at the disposal of the expedition. The vessel left Gothenburg harbour at 6 p.m., on May 18, 1897.

The commander of the *Svensksund* was Count C. A. Ehrensvärd, then a Captain in the Swedish Royal Navy, now Admiral and Chief of the King's Staff. In addition to Andrée, Strindberg, and Frænkel there was also as part of the expedition Lieutenant G. V. E. Svedenborg (now Lieutenant-Colonel), who came as an alternate in the event of any of the other members being prevented from leaving.

The gunboat carried the balloon, the balloon-net, the car, the drag-lines, and the hydrogen-gas apparatus. The remaining part of the equipment—provisions, a steam-engine, etc., were sent by the freighter *Virgo,* which had again been placed at the disposal of the expedition this year.

The *Svensksund* arrived at Tromsö on May 24. The *Virgo* did not reach them until three days later; then the two vessels went on to Spitsbergen together. The voyage passed without adventure; the sea was practically ice-free. They encountered no ice until they entered Virgo harbour. There, however, it was packed close, and was forced only with great difficulty. The ships moved forward only very slowly.

The nearer the party approached to its starting-point, the greater grew the interest in the question of the balloon-house and its condition. This was a matter of the greatest importance, for, if the building had been blown down, it would delay the start very considerably to build it anew, and might even postpone the ascension for another year. Finally Andrée caught sight of a pair of flag-staffs which marked the position of the house, of which the two upper stories soon became visible.

By May 30 the expedition was safely in harbour and the two boats anchored off Pike's House.

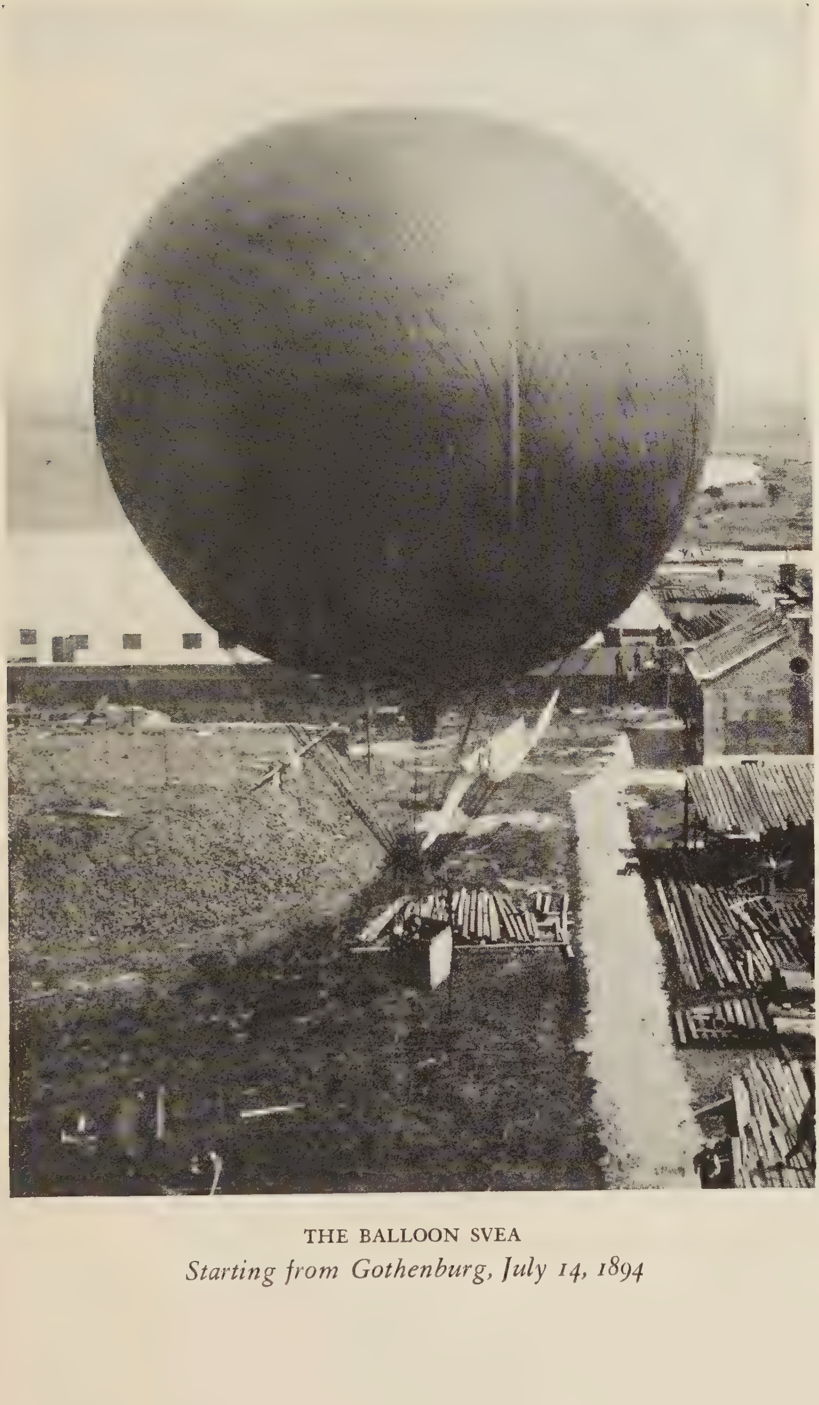
The balloon-house was not altogether undamaged but, fortunately, it had not received much hurt, and it was a relatively easy task to restore it to its former condition.

While this restoration was going on, the cargo of the two vessels was landed. By June 14, the balloon had been placed inside the hangar, where it was filled with air, the better to be able to varnish the seams on the inside. This work went on until the nineteenth, when the filling of the balloon with hydrogen gas began, under the direction of Engineer Stake. This was finished by the twenty-second.

The balloon was the same as that used in the attempt of the year previous, but it was now of increased volume, the weight of the cloth having proved greater than was at first calculated. Its tightness was tested with narrow strips of linen dipped in acetate of lead placed over the seams. A black patch appeared on the strip of linen wherever there was gas leakage.

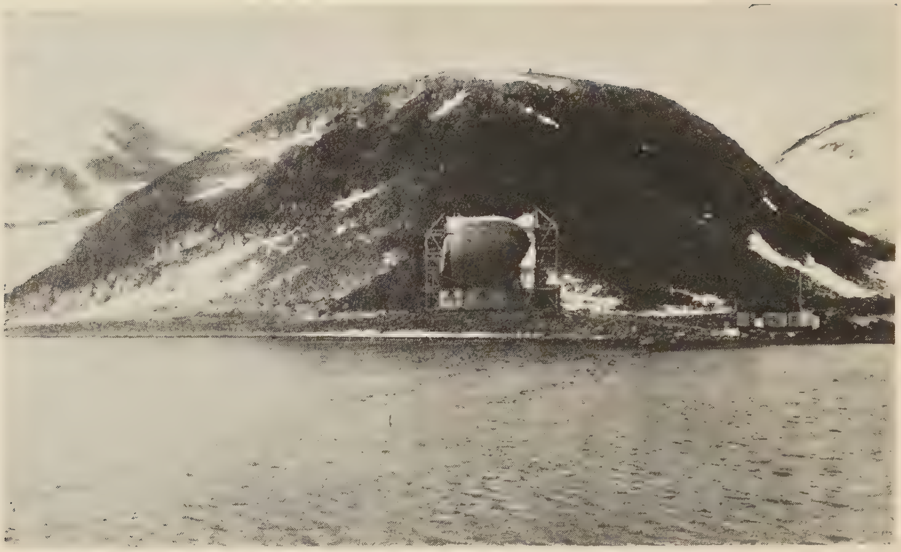
By June 16, the *Virgo* had unloaded and started for home. On the twenty-fifth there arrived the steamer *Express*, known from the year before, and on the twenty-seventh there came another tourist steamer, *Lofoten*, carrying mail. An agreement was made with the captain of the *Express* that, after the departure of the balloon, Svedenborg should be allowed to go by the steamer to the Seven Islands, for the purpose of making a depôt, or cache, of provisions as far north as possible.

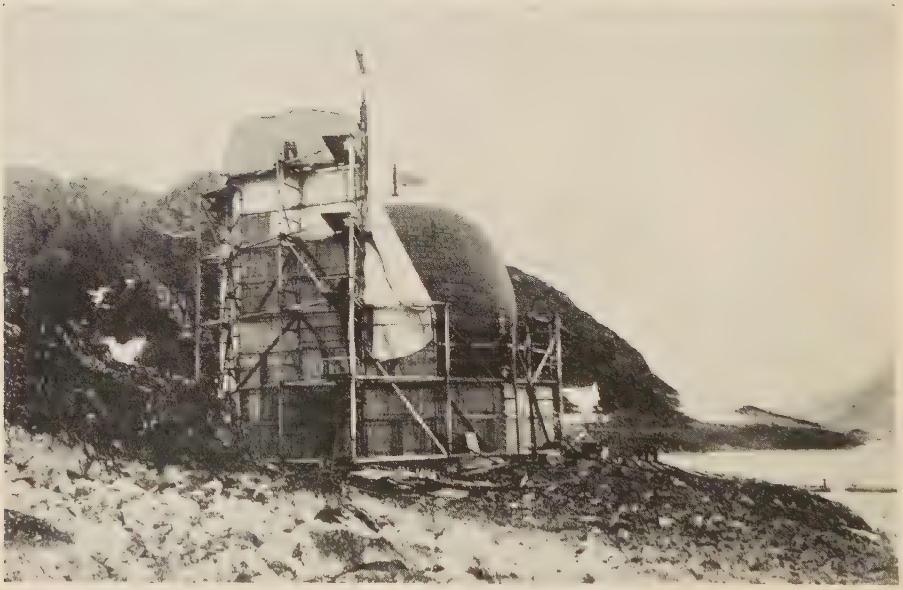
No great difficulties attended the preparatory work for the ascent of the balloon. Here Andrée was greatly helped by his experience of the year before, but, nevertheless, things were not altogether in order before July 1. The reason for the delay was the time taken for testing and varnishing the balloon. This had



THE BALLOON SVEA

Starting from Gothenburg, July 14, 1894





DANE ISLAND AND THE BALLOON-HOUSE, 1897

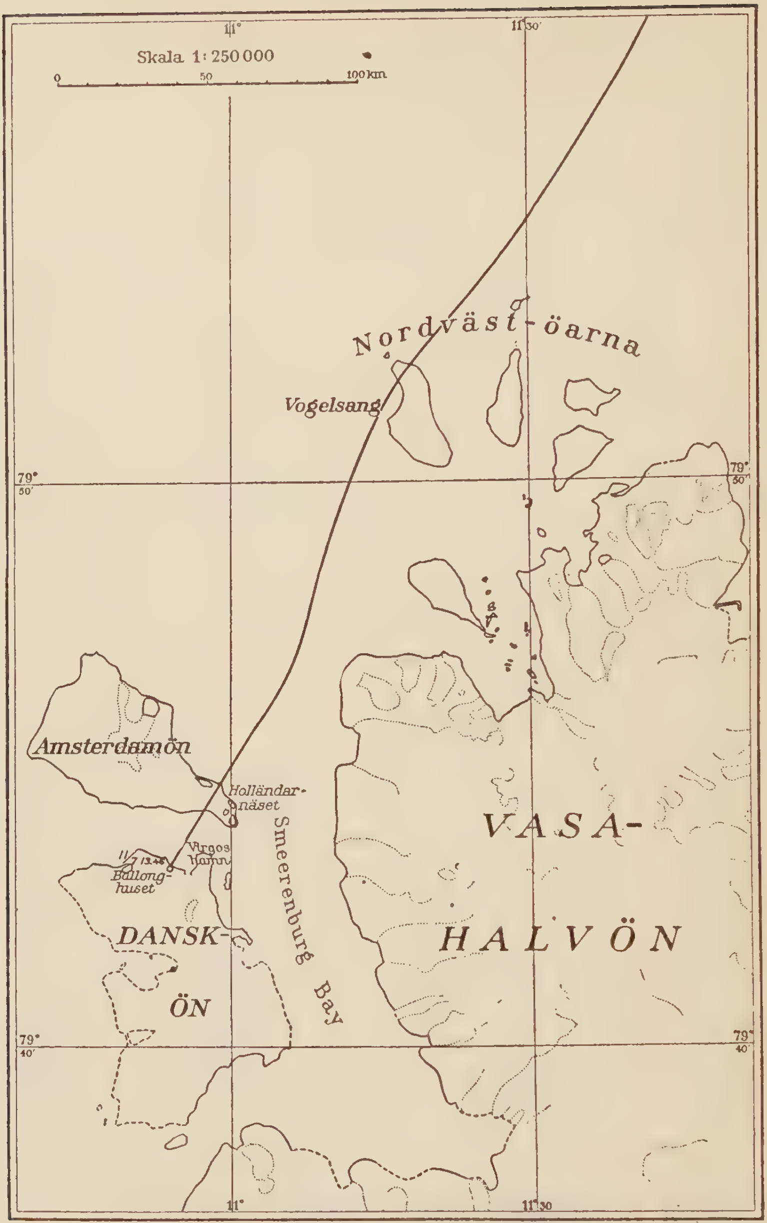
required the services of so many hands that much other business had to be put off.

During the night between July 6–7, there arose a violent storm with heavy squalls, which made the balloon move with such violence in the balloon-house that there was constant danger of its being injured.

The long wait, and the storm, led to the loss of a great deal of gas, so that the balloon had to be resupplied with this quantity. The question arose whether the expedition should avail itself of the wind which blew from the south-west on the morning of the seventh, but the breeze dropped considerably during the course of the day, and swung round to northerly, and it remained mostly northerly during the following days.

Part Two

THE ADVENTURE


11°
11°30′
Skala 1: 250 000
0
50
100 km
79° 50′
79° 40′
Nordväst-öarna
Vogelsang
Amsterdamön
Holländar-näset
Smeerenburg Bay
Virgos Hamn
11/7 13.46
Ballong-huset
DANSK-ÖN
VASA-HALVÖN
11°
11°30

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MAP OF DANE ISLAND WITH ENVIRONS AND THE FLIGHT OF THE EAGLE DURING THE FIRST HOUR OF ITS VOYAGE

VI

The Flight of the Eagle

July 11-14, 1897

It is June 21, 1897, nine o'clock in the evening. Nils Strindberg is sitting alone in the hangar close by the balloon, which is somewhat more than half filled. He is writing to his fiancée. A hard, north-east wind is wailing in the upper parts of the building and among the cliffs above it. He is watching by the hydrogen-gas apparatus, but now his hands are free, for the filling goes on smoothly. His thoughts are with his sweetheart, in Stockholm, and he recalls the happy days gone by and dreams of his unknown future. He is optimistic, however, for the balloon is varnished and ought to be much more gas-tight than last year. The expedition has all the advantage of the summer, with its good, favourable winds and long sunlight. Why should not the enterprise succeed? He himself has firm confidence in it.

But twenty days were to elapse before the balloon he was watching rose and began its journey. Unfavourable weather conditions prevented the start until July 11.

JULY 11.

It was only 3 a.m. on July 11 when the water in Virgo harbour, which previously had been as smooth as a mirror, was ruffled by the first cat's-paws from the south-south-west, and by four the wind had grown quite fresh, with now and then a squall, while the clouds moved northwards at a good rate. Everything pointed to the south wind being steadier on this occasion than before, and that this supposition was general was confirmed by the fact that two Norwegian sealers put into Virgo, seeking shelter from the storm from the south which, they were certain, would last some days.

Andrée was called early in the morning and went on shore to examine things a little more in detail. At eight o'clock he said that he would like to think the matter over for an hour; all the personal belongings were to be packed up at once, however, letters finished, and so on. During the course of the morning the heavens grew still clearer so that between eight and nine it was entirely clear in the north while the clouds from the south sailed across the sky in quick succession. The velocity of the wind, which varied between 15 and 30 feet per second close to the surface of the earth, was clearly much greater at a height of 1000-1500 feet. Thus if the direction and strength of the wind were fairly favourable for an ascent, its very squally character spoke against it.

In Logbook II kept by Strindberg and found with his body there are nine pages written by him in shorthand. On the first of these, written on an ice-floe at 1 a.m. on July 21,[1] and addressed to his fiancée, he gives a detailed account of the hours before the start.

Strindberg says that it was "grand" when at last the decision to start was made. Andrée, Frænkel, Strindberg, Svedenborg, and Machuron, Lachambre's representative, were ashore examining the balloon from the roof of the hangar. After they had discussed the possibilities of starting for a while, Andrée asked: "Shall we try it or not?" Frænkel answered at first somewhat evasively, but then said that they should start. Strindberg answered: "I think we ought to try it," and Svedenborg was of the same opinion. Andrée was serious and said nothing, and then they all returned to the ship. They did not know Andrée's own decision until they were on board, when he said at once to Captain Ehrensvärd: "Well, we have been considering whether to start or not; my companions insist on starting, and as I have no absolutely valid reasons against

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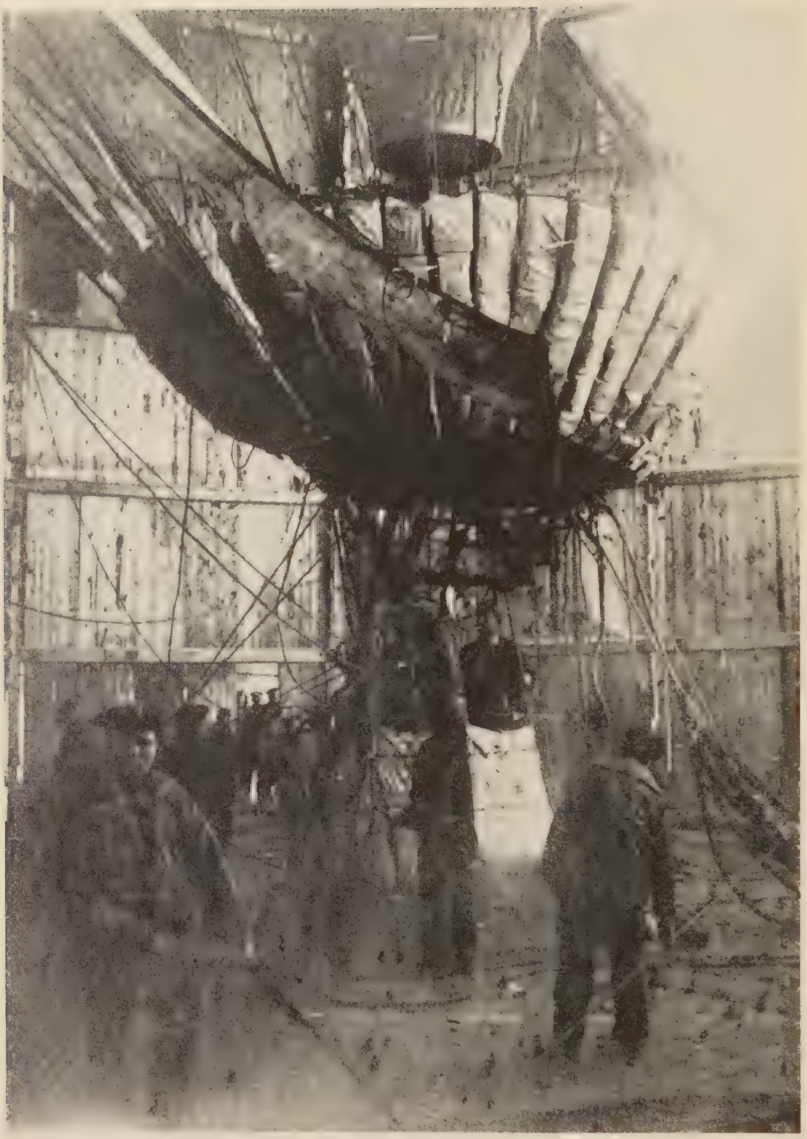
[1] 82° 38′ 7″ N. lat. and 29° 40′ 0″ E. long. Gr.

THE EAGLE PREPARES TO RISE

THE BASKET



THE START—INSIDE THE BALLOON-HOUSE

it I shall agree to it, although with some reluctance. Will you send all hands on shore to begin the work of dismantling the balloon-house?" And then everyone woke up. The sailors had never worked so willingly before, nor had the carpenters. But now they were happy!

Strindberg stayed on board awhile, talking to Ehrensvärd and the doctor, and getting together his things and some instruments that were still on board. Andrée went on shore to direct operations.

The harbour now presented a lively picture. Two sealers had just come in and one had been lying there before. The latter had to shift anchorage so as not to be in the way of the balloon. The weather was gloriously beautiful and the wind south-south-west.

Strindberg went ashore, packed a few articles in the car of the balloon and arranged some things here and there. The work of removing the front side of the house went on briskly, and one plank after the other was thrown down. The balloon stood steady and secure, protected against the winds by the canvas on the fourth and fifth floors, and Strindberg took some photographs of the work. Then he went on board the *Svensksund* again for a moment, together with Svedenborg, to fetch some things they had forgotten and to compare chronometers for the last time. When they came on board, breakfast was just being served and they were persuaded to sit down to table in company with the captain and the doctor. The captain ordered up a bottle of champagne and a toast was drunk to a prosperous journey. Everyone enjoyed the breakfast, but, when Strindberg went ashore again, time did not allow of the others getting anything to eat before the start, and they had to satisfy themselves with sandwiches and ale in the car.[1]

When Strindberg came on land once more, the work had made good progress and the balloon was being allowed to lift a little. A few little balloons were let go to test the direction of the wind, which proved favourable. It was quite an inspiring sight, he says, when the balloon had been lifted to such a height that the bearing-ring of the car left the ground. Andrée gave orders; everyone was willing and helpful, and everything went well. Strindberg walked about taking photographs up to the last minute.

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[1] The "gondola" or "basket" of the balloon.—*Trans.*

The balloon had now risen to such a height that the bearing-ring was a good distance above the ground, the whole being held fast by three ropes. The moment had come to attach the car. When this had been done and a sufficient number of bags of ballast had been taken on board, it was time to say good-bye. This was done heartily and touchingly, but without any signs of weakness. Then Andrée cried: "Strindberg and Frænkel, are you ready to get into the car?" Yes, they were, and so they got in. Strindberg's thoughts turned for a moment to his fiancée and his dear ones at home. What would be the end of the journey? His thoughts came fast, he says, but he had to restrain himself. Machuron, whom Strindberg had found most congenial, stood nearest the car, and Strindberg with some emotion asked him to give his love to his fiancée. But then he had to see that the camera was in order and to be ready to throw out ballast.

And now the three of them stand there, on the top of the car. There is a moment's solemn silence. Machuron says: *"Attendez un moment, calme!"* (Wait a moment, be calm!) The right instant has come. "Cut away everywhere!" cries Andrée. Three knives cut the three lines holding fast the bearing-ring, and the balloon rises amid the hurrahs of those below. The three men answer with a cheer, and then they rise from the balloon-house. A peculiar sensation, wonderful, indescribable, overpowers the travellers to the Pole. But they have no time for much thought. Strindberg takes a few more photographs and then sees that the balloon is sinking. Ballast is thrown out but the car dips into the sea a moment. Then they rise again, and everything seems to be going all right. They can still hear the cheers of the onlookers. Strindberg takes one or two more photographs and prepares to write a few last lines to his fiancée. He intends to throw the card down on Holländar Naze, but has no time to remember it.

According to the notes in Strindberg's memorandum almanac, he and his comrades entered the car at 1.43 p.m.,[1] and three minutes later on, the balloon rose and was now christened "Örnen" (Eagle).

In the description just given of the start, it is curious that Strindberg says nothing of the fatal loss of the drag- or guide-lines and very little of the dipping of the car into the water in Virgo harbour, an incident which was of such importance for the continuation of the journey. These events, which took place a few minutes after the balloon had left its anchorage, are described as follows in the accounts of Andreé and his companions based on the information of some eyewitnesses to the start.

The balloon rises slowly, with rather erratic movements, some 200 to 300 feet, and drives in a north-easterly direction across Virgo harbour, drawing after it the guide-lines, which glide over the water, leaving behind them a broad, sharp furrow like the wake of a vessel. Over the middle of the harbour the balloon begins to sink lower and lower; then comes a sharp jerk which, according to one statement, forces the car half-way down into the water, though according to another witness it merely sweeps the surface.

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[1] As stated in the Introduction, the following description of the balloon flight is based, partly on Strindberg's memorandum almanac, and partly on Andrée's diary. Exact determinations of time are given in these books for most of the notes, but four different methods of calculating the time were employed. In order to obtain uniform chronology, all the times given have been expressed in Greenwich mean time (G.M.T.). This has been done as follows:

Andrée's time-determinations are based on Kullberg's chronometer 5567, which, on July 11, showed oh 51m 45s. All the time-determinations given in Andrée's diary during the balloon flight—with the exception of those stated as being G.M.T.—have been reduced by the subtraction of 52 minutes. Strindberg's times are based on Kullberg's chronometer 5566, which, according to the chronometer journal in his memorandum almanac, showed on July 11 oh 8m 35s. G.M.T. has been obtained by the subtraction of 9 minutes. On the occasions when Andrée and Strindberg have employed astronomical time, this has been expressed in standard time (G.M.T.).

Then the balloon at once rebounds like a vast ball and continues to rise while the travellers empty eight of the bags of sand, thereby losing 455 pounds of its invaluable ballast at the very start.

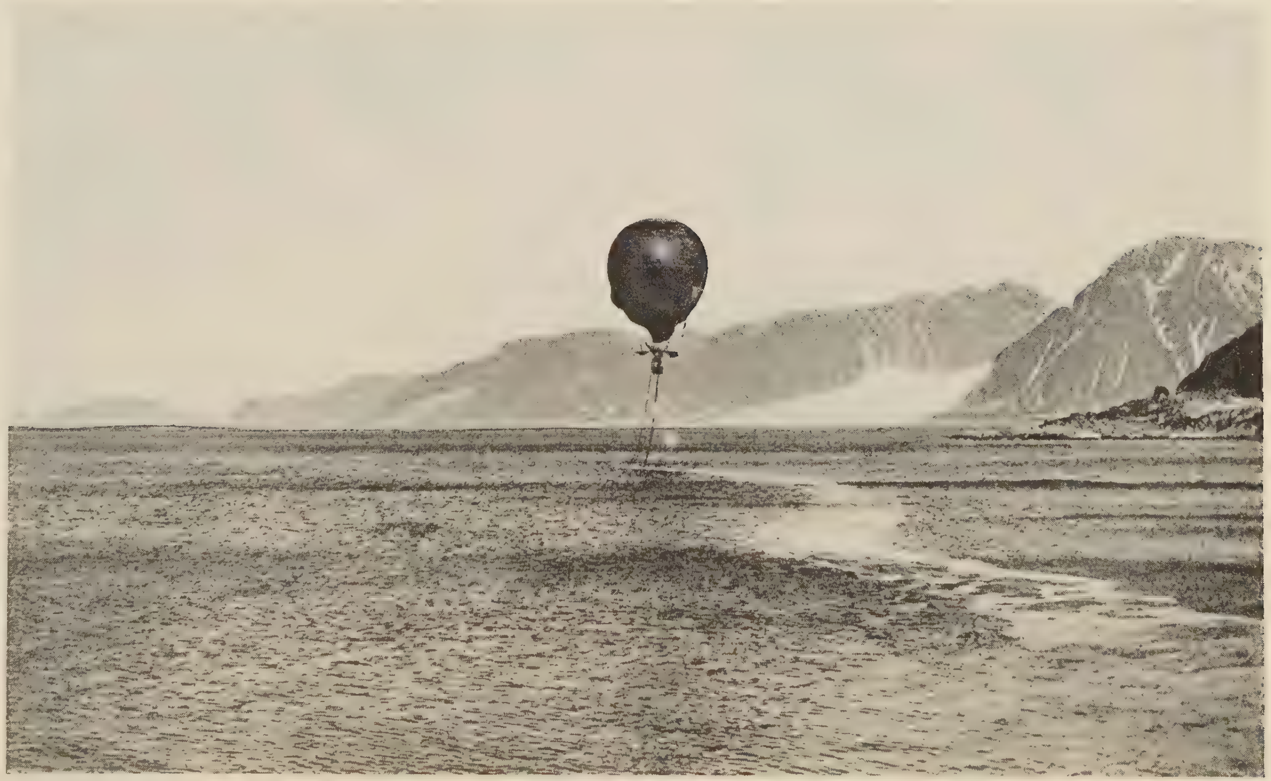
Immediately after this dipping, one of the sailors on shore is heard to cry: "Look! the drag-lines are lying here on the shore!" This causes a great sensation, for the intention was of course to make the whole of the journey at a height of about 500 to 600 feet by means of the drag-lines, whereby a certain dirigibility could be obtained. At first it was thought that the ropes had broken off, but, when they were examined more closely on the spot where they lay, it was found that the threaded section had come unscrewed. The lines had been laid out along the shore below the balloon-house in an easterly direction, in order, if possible, to give the balloon a turn towards that quarter from the very start, thus enabling it to clear the highest part of Amsterdam Island. When they were being laid out, the lines had evidently got a kink here and there, and when the balloon rose these began to twist themselves in such a way as to cause the screws, which had only a very few threads, to come unscrewed, so that the lower two-thirds of the three ropes fell to the earth together. This had evidently taken place at the instant when the balloon was seen to give a jerk. The loss of these ropes meant that the ballast had become further diminished by some 1160 pounds.

Various opinions have been expressed as to the actual cause of this mishap. One thing is certain, however, and that is that the loss of the guide-lines caused the balloon flight to take place in a way altogether different from what had been intended, for the travellers now practically found themselves in an ordinary free balloon which would be compelled to obey the direction of the wind.

Simultaneously with these events the balloon rotated a turn and a half around its vertical axis in consequence of the ballast-ropes, attached to the lee side of the bearing-ring and being pulled through the water, acting more powerfully than the now lost drag-

TESTING THE BAG FOR LEAKS

OFF OVER THE WATER



THE EAGLE DRIFTS NORTHWARD OVER VIRGO HARBOUR lines. The sails which were attached to the balloon, and which had been hoisted while in the balloon-house, had now to be lowered as quickly as possible, as otherwise, in the stiff wind that prevailed, they would have prevented the balloon from turning right again. Immediately after the balloon had dipped, Frænkel was seen climbing into the bearing-ring in order to clear the sails, which were being lowered by Andrée and Strindberg.

Andrée has made no notes in his diary for the first few hours after the start, evidently being too much occupied with the navigation and technical management of the balloon. In Strindberg's memorandum almanac, however, there are short communications and time-determinations with regard to what happened.

Thus, he says briefly: "Guide-rope lost." Immediately afterwards, Holländar Naze was passed at 1.56 p.m. After 18 minutes they are athwart the middle of Vogelsang Island and are sailing onwards at a height of 1950 feet. According to what could be observed from land, the Eagle then swung off to the east across the north point of the island, where it disappeared in a cloud. While passing over the point, Strindberg threw down the tin containing the farewell words to his fiancée which he had forgotten when they were driving across Holländar Naze. As Strindberg had said that he intended letting this last greeting fall at this latter place, a search was made there immediately after the Eagle had gone. As far as we know, however, no one has looked for the little tin on Vogelsang Island.

It is clear that the cloud into which the balloon disappeared immediately it had passed over Vogelsang corresponds to Strindberg's note stating that mist was forming. It was then 2.20 p.m. and the temperature about 34° F. It is silent and still and the average speed of the balloon amounts to 29 feet per second. Only four minutes after the balloon had entered the above-mentioned cloud there is a note that the Eagle had sunk to such an extent that the remaining parts of the guide-lines touched the water. The cause of this was that the balloon had come out of the sunshine into shadow. This sensitiveness to temperature conditions, and especially to clouds and mists, displayed by the Eagle—as by all other balloons—will play a decisive part during the continuation of the journey.

In order in some degree to make good the loss of the lower parts of the guide-lines, the travellers began to repair them three-quarters of an hour after the start. One of the ballast-lines was drawn up, most probably to splice it on to one of the guide-lines.

While this work is going on, photographs are taken at hours marked on the films. For the sake of certainty it is stated that, unfortunately, the first two had been focussed incorrectly. It is evident that during the last few minutes the balloon has risen considerably, for it is stated that 117 cubic feet of gas was lost at a height of 1625 feet. The course at this high level is somewhat more northerly than before. Clouds now begin to surround the balloon in every quarter except to the north-east and over Spitsbergen. The bearings are taken of a cape at Wijde Bay and of the north point of Vogelsang.

Tired after all the events and exertions of the first hours, the polar travellers drained the first of the bottles of ale they had managed to take into the car in the hurry of departure. Then they set to work again vigorously at splicing the guide-line, work which was later on reported finished by 4.24 p.m. The height of the balloon is still 1600 feet and the wind south-south-west. Strindberg once more takes the bearings of the same points on land as before, and they approach the drifting ice which can be clearly seen in the north and north-west. During the whole of the time endeavours have been made, but in vain, to catch sight of the "steamer," by which is probably meant the *Express* which was to make a depôt on the Seven Islands immediately after the start.

A few minutes later on, the balloon begins to be surrounded by light mists, which are not dense enough, however, to prevent photographs from being taken of the first pack-ice that is visible. It is now 4.16 p.m.

The inland ice is seen beautifully on the east side of Wijde Bay, the temperature now rising to 42.6° F. The merry mood of the polar travellers finds expression while "relieving nature."

After some minutes more the balloon has come into the immediate neighbourhood of the edge of the pack-ice, a projecting point of which is passed at 4.54 p.m. For the next half-hour the balloon follows the edge of the ice at a distance of 1600 feet. Spitsbergen disappears in the mist. Far below, a sea-gull is seen accompanying the balloon. The Eagle begins to sink slowly. *"Descendons doucement par un sinusoïd"* (We are slowly sinking in a winding curve), writes Strindberg just after 5.29 p.m.

Under the Eagle the sea is full of finely divided ice and has a beautiful dark-blue changing tint, clearly distinct from the colour previously observed. At 5.36 p.m. the balloon is at a height of 780 feet, and the first four carrier-pigeons are released. The messengers flew off approximately to the west, but they never reached their destination. When Andrée hung up the empty cage a shower of peas fell into the car and evidently excited some mirth.

Immediately after, the balloon sails over the ice in good earnest. The ice-floes become somewhat larger and are well rounded off. About 6 p.m. they pass ice characterized by Strindberg as having been recently broken up. The Eagle floats at a good rate of speed in a north-north-easterly direction.[1] This shows that the fresh breeze which prevailed at the start is still blowing and carrying the balloon at a good rate in the desired direction.

The travellers now take their first dinner, consisting of sandwiches and broth with small bits of macaroni, which they had brought with them warm. Meanwhile the balloon drives onward at about the same speed and in the same direction as before. The ice under the balloon consists almost exclusively of unpacked floes without any glacier blocks. A soft whistling is heard for a long time in the large balloon valve. It is quiet and hot in the sunshine. Only a few birds are to be seen, otherwise there is no sign of life. The only sounds heard are the shrieks of the birds, the whistling in the valve, and, now and then, a crash from the ice.

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[1] Speed was determined by different methods. At greater heights it was calculated from observations with an ordinary level-mirror, and at lower heights probably by means of heaving the log. In both cases the determinations were not very exact.

At 6.41 p.m. there is observed a jagged highland in the southeast. The balloon has reached a height of 1950 feet, and Strindberg makes a Rabelaisian reference to the subject of "lightened ballast."

About 7 p.m., however, the mists begin to grow thick close below the balloon and to the north, but it is still possible to see that, south of a line in an easterly direction, the sea is free of ice.

A quarter of an hour later, Andrée descends into the car to rest. He has been very busily engaged ever since the early morning. He has determined that the expedition shall start; he has directed the work for the start; he has experienced the first and fateful minutes of the journey; and he has seen the destruction of the guide-lines, with the help of which he had intended to steer the Eagle towards his goal. We may be sure that he was the most zealous man in that little car in the splicing of what was left of the guide-lines, and as chief on board he has directed the navigation of his vessel. The condition of things in the evening being as quiet as it is, he considers that he can at last snatch a bit of necessary rest.

During the whole of this eventful day, the eleventh of July, Andrée has not had time to make more than a few brief remarks in his diary, and these are now partly illegible. On the inside of the cover of his diary we find, however, a rough copy of the message to be sent by the first buoy-post. He uses this rough copy too, when on another leaf of the diary he writes the communication which was put into the first buoy thrown out. But, as will be shown later on, this buoy was not dispatched until a couple of hours after Andrée had gone to rest. Besides the above, at 6.39 p.m. he has made a note about "guide-rope" and "steering arrangement," but it is impossible to decipher the words. Then follow some remarks respecting the behaviour of the chronometers.

Strindberg and Frænkel now have the watch to themselves, and Strindberg keeps the journal of what takes place. The balloon is floating at an altitude of 2200 feet, above a thin layer of clouds, through which the ice sometimes becomes visible. The altitude is increased to 2270 feet, but the temperature is still about 34° F. The ice is now visible only along the horizon to the south-south-west, while the clouds have become denser below the Eagle. Everything is silent and quiet; nothing is heard but a faint murmur from the south-east and east, and the whistling from the valve. The sun shines warmly, but light puffs of wind are felt every now and then. Frænkel and Strindberg speak in a whisper so as not to disturb Andrée. Far away to the south-east, land is visible, probably North-East Land. The sky above the balloon continues clear but underneath the clouds drive onward in a direction which is somewhat more easterly than that of the balloon. As the ice is not visible, it is impossible to determine the course and the speed.

The journey continues along a horizontal level at an altitude of 2200 feet. When, at 8.23 p.m., the ice becomes visible for a moment between the clouds, the course is determined as being N. 45° E. (magnetic). "We are now travelling horizontally so beautifully that it is a pity we are obliged to breathe as that makes the balloon lighter of course. And so Frænkel and I are spitting, too," writes Strindberg.

The hours pass while Andrée sleeps. Strindberg makes his sun observations, while Frænkel writes them down in Strindberg's memorandum almanac. A note is made of each little event, the hour and minute being given, for instance, whenever "nature is relieved."

Just before 9.43 p.m. the balloon has sunk somewhat so as to touch the upper edge of the clouds at an altitude of 1650 feet. The danger of coming out of the sunshine and thus causing the balloon to fall still lower induces them to throw a buoy and about 18 pounds of sand overboard.

As was mentioned before, the communication intended for a mail-buoy, which Andrée handed to Strindberg before he went to lie down at 7.06 p.m., was not sent off at that time. We know this because the buoy has been found, and the date given in it is July 11, 10 p.m. This hour agrees with the aforementioned note that a buoy had been thrown overboard, so that, in all probability, buoy number 4 was there referred to.[1] The communication is as follows:

> "Buoy No. 4: The first
> thrown out
> *on July 11, 10 p.m. G.M.T.*
>
> Our journey has so far gone well. We are still moving on at a height of 800 feet in a direction which at first was N. 10° E. declination but later N. 45° E. declination. Four carrier-pigeons were sent off at 5.40 p.m. Greenwich time. They flew westerly. We are now in over the ice which is much broken up in all directions. Weather magnificent. In best of humours.
>
> ANDRÉE STRINDBERG FRÆNKEL
>
> *Above the clouds since*
> *7.45 G.M.T."*

If we examine the original dispatch a little more in detail we at once note that the time given as "10 p.m. G.M.T." and the last words "Above the clouds since 7.45 G.M.T." are not in Andrée's handwriting but in Strindberg's. It is the latter who added these lines after Andrée handed his communication to him. It is now possible to determine when this was done. After the four pigeons had been sent off at 5.40 p.m. the balloon had, as already described, risen and then floated at a height of from 1600–1950 feet. Consequently, Andrée must have written his communication im-

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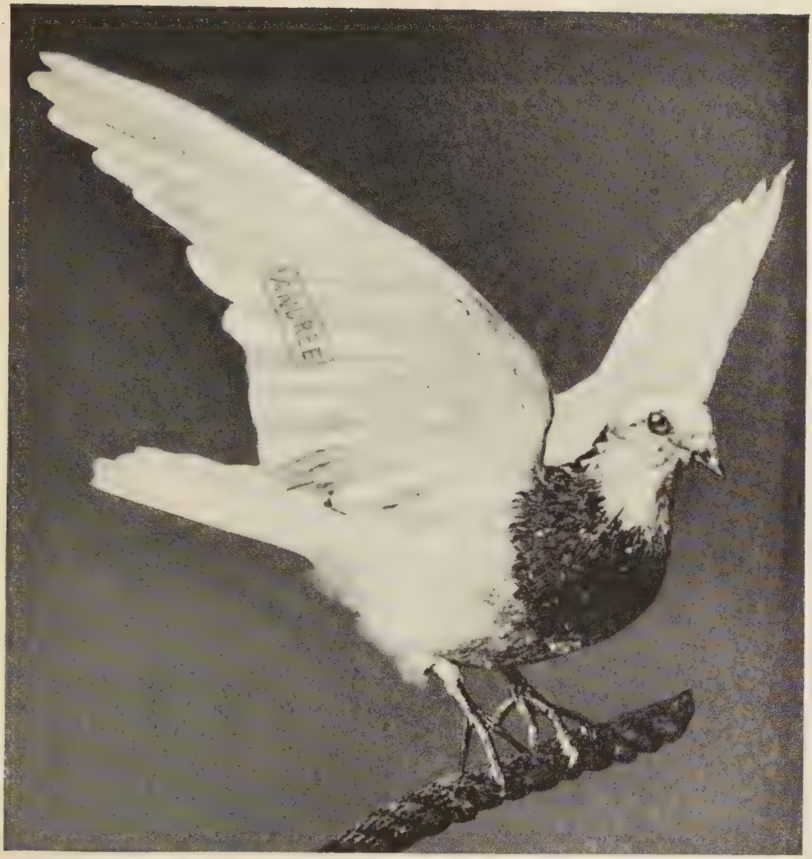
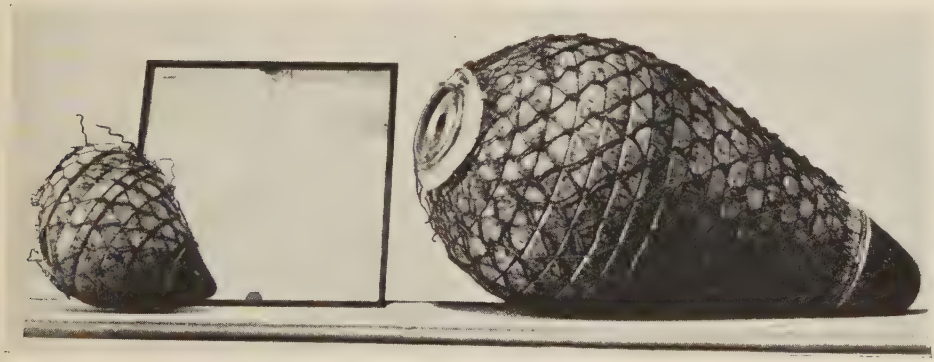
[1] The story of this mail-buoy is briefly as follows. It was found at Lögsletten on the coast of Finmark, Norway, on August 27, 1900, by a woman collecting driftwood. According to her statement the buoy had driven ashore just before she found it, so that it had been carried by the waves 1142 days after it had been thrown from the balloon. During the whole of this long period the buoy, with its valuable contents, had not suffered any damage. It is preserved side by side with the message in the State Historical Museum, Stockholm.

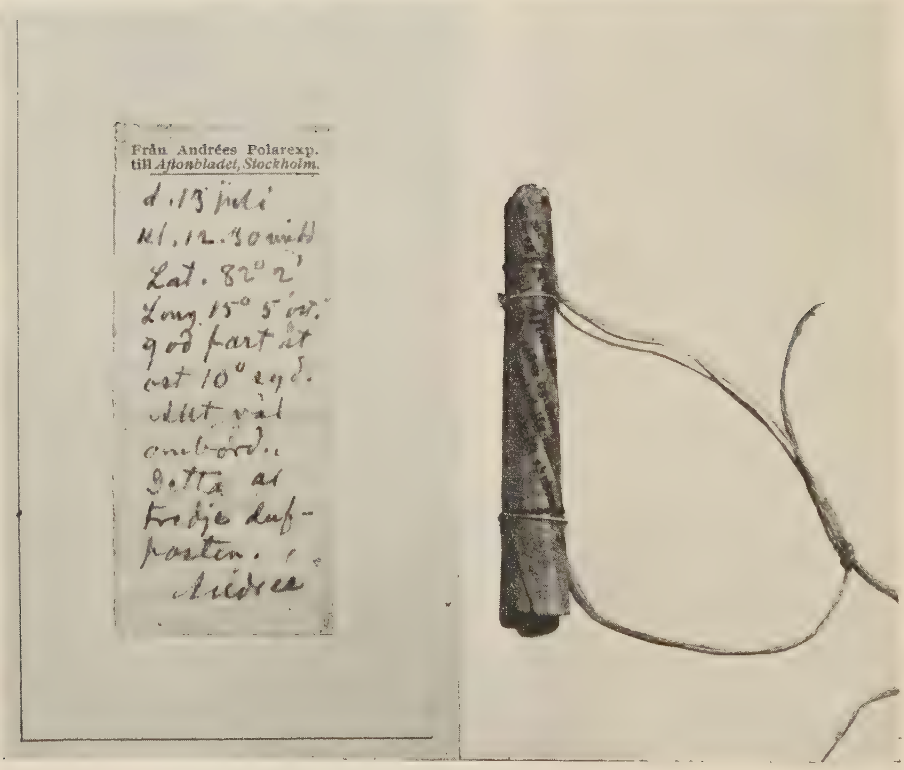


THE CARRIER-PIGEON DISPATCHED FROM THE EAGLE ON JULY 13
It is stamped under the wing with the word "Andrée"



LARGE POLE-BUOY AND BUOY NO. 7

THE PRIMUS STOVE
CARRIED BY THE EXPEDITION



Från Andrées Polarexp.
till *Aftonbladet, Stockholm.*

d. 13 juli
kl. 12.30 midd
Lat. 82° 2'
Long. 15° 5' ost.
god fart åt
ost 10° syd.
Allt väl
ombord.
Detta är
tredje dufposten.
Andrée

THE FIRST PIGEON-POST (*see page* 76)

mediately after the carrier-pigeons had been sent off, that is, about 6 p.m. He then gave the dispatch to Strindberg with the order to put it into the buoy and to send off the latter at a suitable time. When, about ten o'clock in the evening, the Eagle was sinking through the clouds, the buoy was thrown out together with the 18 pounds of sand in order to lighten the balloon. It is really remarkable that we are now aware in such detail of what took place on board the Eagle in respect to this buoy, which after drifting amid ice and sea for more than three years, was found one day late in the summer on the naked coast of Finmark, and which, until the present moment, formed the most detailed communication hitherto received from the three men who disappeared across the island outside Virgo harbour on the eleventh of July, and whose fate can now be so clearly read from their own notes.

Immediately after the buoy had been sent off, the note was made, with an interrogation mark: "a shot ? is heard." It must have been the ice cracking. A few minutes later, the ice gleams through the clouds, and is seen to be still very much dispersed. Exactly at 10 p.m. the course can be approximately determined as N. 60° E. Twenty-two minutes later five rungs of the rope ladder are thrown out as unnecessary ballast and eight minutes later six more rungs are thrown overboard in addition to 18 pounds of sand from the same sack as before. Meanwhile they have passed a fairly large opening in the clouds.

Immediately afterwards, buoy number 7 is thrown overboard. Strindberg notes in his memorandum almanac the communication it enclosed:

> "This buoy is thrown out from Andrée's balloon at 10.55 G.M.T. on July 11, 1897, in about 82° latitude and 25° long. E.fr. Gr. We are floating at a height of 600 metres [1950 feet].
>
> All well
>
> ANDRÉE STRINDBERG FRÆNKEL."

This buoy, too, with its message reached its intended goal, Stockholm. It was discovered in Kollafjord, on the north coast of Iceland, on May 14, 1899, and does not seem to have lain long on the shore before it was found on the beach—at Hlit farm on the west side of the fiord—672 days after it had been thrown from the Eagle. The buoy, when found, was rent on one side and the copper wire, which had supported a little flagstaff, was lacking. From Kollafjord the buoy was sent to the Governor in Reykjavik, who forwarded it to the Minister of Iceland in Copenhagen, by whom it was sent on to Stockholm. When the dispatch was published everyone was astonished to find how brief it was, although the leaf on which it was written afforded good space for more. Now we understand very well that the situation did not allow of Strindberg's writing in any detail.

Eight minutes after the buoy had been sent off with its message, a note is made that the clouds are moving at a height of no more than 1525 feet and that the temperature is 33.1° F. After another eight minutes, the balloon floats at 1500 feet. Strindberg wonders whether it is cloud or land that is seen in the east-north-east, but it soon proves to be cloud. His attention is again directed towards the horizon in the east, where the shadow of an alto-cumulus cloud looks as though it might be water and ice. Its extension is about ninety degrees, he writes, from immediately below the sun to N. 110° E.

JULY 12.

IT is not without reason that Strindberg is so interested in that cloud which the balloon is on its way to meet. Now it is eleven minutes past midnight, July 12. The course is stated to be direct east, and immediately afterwards there is a note that the balloon is entering the shadow of the cloud in question. The result of this is at once apparent. After the lapse of four minutes, the guide-lines touch the ice, and the guide-roping[1] begins. Onward sails the balloon, surrounded by a slight mist; the quiet sailing at high levels is ended, and the situation is quite altered. The balloon flight enters an entirely new phase. "The sun has gone," writes Strindberg, "but we keep a very level course."

As was the case when passing through the little cloud over Vogelsang Island, the balloon sinks quickly when the warming rays of the sun no longer reach her. The guide-roping continues in a direct easterly course, at a speed of about 10 feet per second, at a height varying between 325 and 400 feet. At 1 a.m. it is considered necessary to throw out about 26 pounds of ballast. Like an evil omen a bird is seen, black and distant, and below them gape the wide rifts in the pack-ice, extending mainly in an east-and-west direction. The mists thicken around the Eagle, so that it becomes impossible to see more than one to three miles in any direction. The field of vision covers nothing but ice and water. At 1.26 a.m., the balloon comes to a standstill, apparently in consequence of a calm. Another buoy is thrown overboard. Its number is not stated nor is it mentioned whether any written communication was enclosed. A note is made that there is a current of air from the south-south-west.

Andrée is called about 2 a.m. and Strindberg and Frænkel go to lie down, while the chief takes the watch alone.

Andrée's notes begin at 2.59 a.m., and embrace, first of all, observations respecting the course and speed of the balloon, these being afterwards entered in Strindberg's memorandum almanac. These notes make extremely interesting reading, as they cover just the period which was of such importance for the expedition, namely, when the wind began to turn and carry the Eagle from its intended course to one directly westwards. The following table, therefore, summarizes these observations from the moment when, in consequence of the balloon's having come into a region of clouds and mists, it sank from its considerable height bringing the high-level part of the journey to a conclusion.

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[1] See the chapter entitled "Trial Flights in the Balloon Svea," (page 22).

Time		*Course*	*Speed*
0.01 a.m.		E.	130 inches per second
1.26			0
2.59		N. 20° W.	inconsiderable
3.08		N. 15° W.	20 inches
3.35	N. 24° W.	N. 27° W.	20 inches
3.51		N. 32° W.	15½ inches
4.01		N. 25° W.	
4.13		N. 28° W.	
4.28		N. 50° W.	31¼ inches
4.56		N. 60° W.	12½ inches
5.18		N. 80° W.	
5.26			54½ inches

The balloon now drifted slowly with the three men, directly westwards. Alone on the roof of the car, Andrée makes very brief notes in his diary respecting his observations. He thinks he hears an auk and he describes a fulmar, another arctic bird, which circles around the balloon without showing any signs of fear. At 3.58 a.m., the fog lightens somewhat, and then the balloon rises a little. Some part of what Andrée and his companions had first taken for open water he now discovered had merely been snow-free and water-covered ice. There are large expanses of ice of a light, dirty-yellow tint, and of the same colour as the fur of the polar bear. The ice shows few or, more correctly, no signs of pressure. If the surface were hard, a horse and sledge could traverse it. There is no land in sight but the horizon is not clear. He finds the journey in all truth a wonderful one. He feels cold, but will not awake his sleeping comrades as they need rest. Neither bears nor seals are to be seen. Andrée adds that when the Eagle descended, the lines did not lie properly. This remark must evidently refer to the occasion when the balloon sank from a height of about 1625 to one of 65 feet. The faulty arrangement of the ropes causes the car to move backwards, and the sails press the balloon down. Thus the same condition of things exists now as was brought about when the "dipping" into Virgo harbour took place. The single-spliced guide-line the Eagle carries cannot counteract the rotating action of the ballast-lines. This is a pity, for it is evident that the movement of the balloon does not correspond to what the existing conditions favour. This opinion is confirmed, too, by the determination of the speed as being 31¼ inches per second, when taken at 4.28 a.m. One hour later, the speed falls to 12½ inches per second.

About five o'clock, a seal (*Phoca barbata*)—which may have been a walrus—was photographed for the first time. Two others were in sight, one of which was startled, while the other paid no attention to the balloon. The ice is now crossed by lanes of open water. The car now frequently sinks to a height of no more than 50 or 60 feet, but by 5.30 a.m. the speed of the balloon has increased somewhat. Ever since Andrée was called at 2 a.m., the sky has been one even expanse of clouds. Just before 6 a.m. the balloon once more came to a standstill and did not begin to move again for forty minutes, when it went straight to the westward. During this time, Andrée observes a fulmar quite near the car. Strindberg, who had slept until a few minutes past seven, now comes up to Andrée and takes over the observations until 5 p.m. There is a slight mist, which restricts the outlook to a distance of half a mile in every direction. Round about them extends ice of the same description as before.

Seventeen hours have now passed since they started from Dane Island. They had had no other meal than the one taken at 6 p.m. on July 11 and so a much-needed breakfast is prepared. Göransson's cook-stove, which, to avoid the danger of fire in the car, hangs beneath it, is primed at 8 a.m. and lowered to its place again while it is doing its work. In the interval of boiling the coffee, a barrel on board—the "barrel-of-all-work" or "universal barrel"—is altered from a "night-stool" into a "day-stool." After 18 minutes the coffee is ready, and the three comrades take breakfast together in the pleasantest of moods. Andrée sucks the can-opener which had been used to open the can of condensed cream, and he also notes that he observed another fulmar, and mentions a "shower of peas," but without elaborating on this incident.

At about 10 a.m. the sun peeps through the mist and makes it possible for Strindberg to make an observation of longitude with the help of a level-sextant and Andrée's chronometer. The speed of the balloon is now inconsiderable, but it increases until, immediately after 11 a.m., it has risen to 17 feet per second. The temperature is just above freezing, and the direction still westwards.

At 11.13 a.m. some carrier-pigeons are sent off. One of them tries to settle on the guide-rope and afterwards circles around the balloon. Two others settle on the ice, but at last they all disappear into the mist to meet an unknown fate.

About midday the voyagers pass an ice-field which is more than a thousand yards across, from which nearly all the snow has disappeared, leaving many pools of fresh water on the surface. A light mist still prevails, from which there falls a fine drizzling rain.

They now pass a "lead" or channel in the ice, about 250–300 feet wide, extending in a north-and-south direction as far as one can see in the mist, i.e., about a mile.

A couple of minutes after Strindberg has noted: "Blood-red ice, perhaps a relic of a bear's meal," the balloon sinks at 3.06 p.m. so low that the car bumps twice against the ice.

The position is clearly critical during the following hour. Every attempt is made to make the balloon rise. The heavy knives for cutting the guide-ropes, 55 pounds of sand and some other ropes are all thrown overboard. At 3.16 p.m. a little iron anchor and a small pulley are flung out, and are followed after half an hour by a ballast-line and the scraper with which they had intended to take earth-samples. But as all these efforts seem unable to bring about the desired effect, the balloon continuing to drive onwards at such a low level that there is danger of the car being smashed against the ice, resource is had to the large "Pole-buoy," which is thrown overboard at 4.51 p.m. without any communication inside. This last sacrifice, of the very large buoy which they had promised themselves to deposit at the Pole itself, must have been the heaviest they made, for it implied a doubt, or even a feeling of certainty, that the expedition would not reach its goal. But the attempts made to lighten the balloon enough to make it rise again prove unsuccessful, for immediately after Strindberg has written that the big buoy has gone, the car hits the ice forcibly several times in succession. The speed of the balloon is now about 8 feet 5 inches per second, and the course N. 100° W. The reason that the Eagle does not rise is because it is heavily weighted down by the fog.

Like two of the three buoys previously thrown overboard, the large "Pole-buoy," too, has been found. This occurred on the shore of King Charles Land, on September 11, 1899, two years and two months after it had been thrown from the Eagle. It was found 50–60 paces up the beach from the water-line, or presumably just the distance that the ice presses up, on the north side of King Charles Land. The buoy when found was rammed a little askew, the copper wire on the upper part had been torn away on one side and some of the layers of cork were injured. All the more or less ingenious studies and theories carried out and published after the buoy had been found, respecting the spot whence it had started its drift, have now been replaced by the certainty which speaks from Strindberg's own notes.

Strindberg's memoranda come to an end here and he resumes them at 5 a.m. the next morning. Andrée once more continues the observations and allows himself no rest until midday of July 14, i.e., after the expedition had landed.

The following hours are filled with difficulties. The car is dragged across the ice, against which it often bumps, in a westerly direction through the mist and fog. At 5.14 p.m. there is a note: "8 'touches' in 30 minutes." It is not strange, then, that one or another of the travellers loses patience and gives expression to his discontent at not being allowed "at least to eat in peace." The fog reigns uninterruptedly. At 6.35 p.m. the car bumps against the ice every 5 minutes, but the temper of everyone on board is noted as "good."

The situation becomes even worse. The fog continues and the balloon sinks still lower, so that the car bumps against the ice every other minute, while the speed, in a west-south-westerly direction, amounts to from 5½ to 8 feet per second. Every 500 feet the car leaves its mark on the ice. As Andrée expresses himself, the ice is "stamped." Finally, at 10 p.m., the Eagle comes to a standstill. The balloon is then heavily weighted down and everything is dripping.

It is in this situation that Andrée, keeping watch alone in the car of the Eagle, and after having entered the hour, 10.53 p.m. writes the following lines:

"Although we could have thrown out ballast, and although the wind might, perhaps, carry us to Greenland, we determined to be content with standing still. We have been obliged to throw out a great deal of ballast today, have not had any sleep or been allowed any rest from the repeated bumpings, and we probably could not have stood it much longer. All three of us must have a rest, and I sent Strindg. and Fr. to bed at 11.20 o'cl. (5567), and I mean to let them sleep until 6 or 7 o'cl. if I can manage to keep watch until then. Then I shall try to get some rest myself. If either of them should succumb it might be because I had tired them out.

"It is not a little strange to be floating here above the Polar Sea. To be the first that have floated here in a balloon. How soon, I wonder, shall we have successors? Shall we be thought mad or will our example be followed? I cannot deny that all three of us are dominated by a feeling of pride. We think we can well face death, having done what we have done. Isn't it all, perhaps, the expression of an extremely strong sense of individuality which cannot bear the thought of living and dying like a man in the ranks, forgotten by coming generations? Is this ambition?

"The rattling of the guide-lines in the snow and the flapping of the sails are the only sounds heard, except the whining in the basket."

Of all that it has thus far been possible to decipher of the documents found on White Island, these lines are the only ones that throw a light on Andrée's deeper feelings and thoughts regarding the expedition he is leading, the expedition in the presence of which the civilized world stood wondering and questioning, and from which relatives and friends at home were anxiously awaiting news. After a silence of thirty-three years comes the reply to all these questions, given by the living words which Andrée and Strindberg wrote themselves, and which have been so long hidden by the ice.

JULY 13.

AND so begins the thirteenth, the date beside which Andrée has written: "Sic!"

The balloon remains fast during the whole night. Half an hour after midnight, Andrée notes a northerly wind with a velocity of 8 feet 9 inches per second. The temperature remains as before about 32° F. The balloon sways, twists, and rises and sinks incessantly. It wishes to be off but cannot, for now the wind is only 6 feet 10 inches per second. At half past three in the morning, however, the north-westerly wind has increased somewhat in strength. No living creature has been seen the whole of the night: no bird, no seal, not a walrus, not a bear. About six o'clock Strindberg is up once more, and continues his notes in the almanac, while Andrée goes on with his diary. Before Strindberg starts work he devotes a little attention to his personal equipment. Before, he had nothing on his feet except wool-lined sporting boots and a pair of woollen socks, but with these he felt cold. Now he puts on first of all the woollen stockings, then *raggsockor*, or socks of wool and hair, and last of all snowboots. All this he finds a warm and pleasant footwear.

About 9 a.m. the fog lightens enough to allow the sun to peep through. Now and then blue patches of sky are seen, a refreshing sight after all the "stampings" during the night. The buoyancy of the balloon increases splendidly, too, in consequence of the improvement in the weather. Strindberg even ventures to wonder if there is any prospect of a high-level flight.

A few minutes before 9.30 a.m. Strindberg awakens Frænkel and at 10.55 a.m. the balloon at length makes itself free by its own efforts, with a jerk which gives the car a good bump. The balloon had remained fast no less than thirteen hours in this spot, which Strindberg calls "the second resting-place." The reason that the Eagle did not come loose during the whole of this period, in spite of the north-westerly wind in the morning having increased to 11 feet 9 inches per second, was that one of the guide-lines had fallen behind and underneath a block of ice and become fastened there very securely when the wind gradually turned round about 90°–100°.

The determination of their position, made possible by the fog having lightened so much as to allow the sun to be visible, showed that, during these thirteen hours, the balloon was lying at 82° N. lat. and 16° E. long.

It may here be remarked that if the Eagle's guide-line had not fastened around the ice-block, the wind that had blown during the night would have carried the expedition back to northern Spitsbergen.

The flight at a high level that Strindberg hopes for does not take place, however. The sun has again disappeared in the clouds. But the Eagle is free and while it drives onward in an east-north-easterly direction at the rate of about 10 feet per second, preparations are made for a much-needed dinner. The Göransson cooking apparatus is put in order to prepare a Chateaubriand. Frænkel, who is evidently in charge of the housekeeping, looks greedily for water to clean the dishes with. This means, most probably, the melted snow-water which he sees lying on the ice beneath him. The bill-of-fare for the dinner which was served at about twelve o'clock, midday, was as follows:

DÎNER DU 13 JUILLET

Potage Hotch Potch
Chateaubriand
The King's Special Ale
Chocolate with biscuits
Biscuits with raspberry syrup and H_2O.

"A good and invigorating meal!" writes Strindberg. Immediately after this he notes that the tracks of a bear are visible on the ice. The weather has now become colder. The wet rigging is coated with ice.

Perhaps it is a result of the "invigorating meal" that the polar travellers now summon up all their energies and send off a group of carrier-pigeons with dispatches. At 1.08 p.m. the four pigeons, the third post, are set free. The birds first settle on the instrument-ring and the guide-lines before flying off.

After strange adventures one of these messengers at length came to Stockholm. On July 15, 1897, when the Norwegian sealer *Alken* was in 80° 44′ N. lat. and 20° 20′ E. long., Captain Ole Hansen was called on deck between one and two in the morning because "a peculiar bird" had settled on the mast-head of the ship. It had come from the south, pursued by two gulls (*Larus* *glaucus*). The skipper, who thought the bird looked like a ptarmigan, climbed up the rigging and shot it. It fell overboard and it was not thought worth while to lower a boat to get it. But when, later in the day, they met another sealer, they learned that it might have been one of Andrée's carrier-pigeons, and, although they were not certain that Andrée had begun his balloon flight, the skipper returned to the place where he had shot the bird and sent out two boats to look for it. And, strangely enough, one of the boats actually found the bird. When the skipper saw that it really was a pigeon, he examined it more closely and then found the letter-cylinder. This was made of parchment soaked in paraffin and had outside the following message written in Norwegian: "From Andrée's Polar Expedition to *Aftonbladet*,[1] Stockholm. Open the cylinder from the side and take out two letters; of these the one in ordinary hand is to be wired to *Aftonbladet*, the one in shorthand is to be sent to the paper by the first post." In the cylinder was found the short letter which is shown in one of the illustrations. It reads as follows:

> "From Andrée's Polar Expedition to
> *Aftonbladet*, Stockholm
> July 13
> 12.30 midday. Lat. 82° 2′ Long. 15° 5′ E. good speed to E. 10° S. All well on board. This is the third pigeon-post.
> ANDRÉE."

The shorthand dispatch was missing, however, which Strindberg, in accordance with an agreement, was to send with each pigeon-post, placed in the same cylinder as Andrée's communication. People have wondered why this dispatch was missing, but, knowing what we do now, it is not strange that Strindberg was unable to devote any time to writing it.

The poor pigeon, which had been a day and a half without food, was so fatigued that it had sat with its head under its wing, and could certainly have been caught alive.

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[1] An evening paper.—*Trans.*

But no long rest or peace was to be vouchsafed to the crew of the Eagle. It is true that Andrée went down into the car to sleep after the pigeons had been released, but Strindberg is certainly right when he says that Andrée will probably not get any proper rest. For the balloon has now sunk so low that the car has again begun to strike against the ice. As for Strindberg, he hits on the plan of climbing up into the bearing-ring where he thinks it is "confoundedly pleasant." He feels "so safe and so at home" up there. He knows that up there the bumps will be felt less, so that he can sit calmly and write without having to hold fast. It is true that the vibrations of the guide-ropes are felt up there, which is not the case in the car, but this is as nothing compared to the unpleasantness caused in the car by the bumping.

At 2.06 p.m. the fog is again bad. A fine drizzle comes from it which fastens on the ropes like hoarfrost, a condition of things which, of course, is extremely dangerous, as it quickly increases the weight of the balloon. Strindberg makes a note, too, of a few bumps against the ground, and a quarter of an hour later, after the sun has disappeared in the fog, of "stampings" in quick succession.

While the balloon slowly drags the car across the hummocks, becoming coated with ice and hoarfrost, Strindberg remembers that he is in a polar climate and makes a list of the clothes he has on. His scanty equipment consists of:

One Jaeger wool jersey.
One Jaeger hunting-shirt.
A pair of Jaeger pants.
A blue "army suit."
A wool-lined leather waistcoat.
A pair of rather thin woollen stockings.
A pair of *raggstrumpor* (stockings of wool and hair).
One cap (woollen).

A pair of fur-lined snowboots.
A pair of woollen mittens.

Once more something has to be done to lighten the balloon if possible, so as to get the car off the ice. A choice is made of buoy number 9 and a box of medicines, and these are thrown overboard. The guide-ropes then lie properly, and scrape back to their proper places if they happen to cross each other.

At 4.35 p.m. Strindberg notes that one of the pigeons which had been released four hours ago has returned and circled around the balloon a couple of times. Then the bumping against the ice begins once more; "constant touches," writes Strindberg.

But worse is to come! Constantly recurring violent blows, constant fog, notes Strindberg, while his vessel drives over the ice in an easterly direction, at a speed of about 6 feet 6 inches per second. Presumably the ice would be easily traversable as far as smoothness is concerned, but not as regards the openings in it.

At 6 p.m. something catches fire in the car, but it does not seem to have been very serious, for nothing more is said about it.

Another half hour passes. The course is more northerly, but the speed is not worth noting. No birds are to be seen or heard, and Andrée thinks: "I suppose there is no land near." He receives a severe blow on the head but, at the same time, is encouraged by finding that the balloon still contains much gas. It has contracted no more than one-third, measured by the hoop round the middle.

Strindberg, who, about 7 p.m., also tried to find some rest in the car, was made sea-sick by the concussions against the ice. He and Frænkel climb up again into the bearing-ring, and Strindberg makes repeated notes respecting the speed of the balloon.

It is now about 8 p.m. A decision has been reached to make a vigorous effort to get the Eagle up and sail. The men consider what articles can be dispensed with, and they resolve to get rid of six small buoys,[1] weighing altogether 26 pounds, the winch, weighing 35 pounds, 165 pounds of sand, the aforementioned "universal barrel," 11 pounds, and finally various provisions, amounting to no less than 440 pounds. All this is thrown overboard. Up to that moment, the guide-ropes had not left the ice since the first high-level flight ended. Now, however, the Eagle rises sufficiently to allow the sails, which lay crosswise and taut, to carry well, and the speed is increased. The balloon goes nicely after the sails have been set in the way described, and another 100 pounds of ballast is thrown out. "Altogether, it is quite stately!" writes Andrée.

Now there is a moment's calm. About 9 p.m., Frænkel considers he may go to bed. Andrée and Strindberg "shoot the sun" together, the former down in the car, the latter up in the bearing-ring. While Strindberg sits there, he opens his knapsack and puts on an extra pair of balloon-cloth trousers and an Iceland jersey, intending to snatch a little sleep. But first of all he reads the last letter he received from his fiancée, and has quite "an enjoyable moment." After a number of observations at 10.20 p.m., Strindberg makes no further notes before the landing on the ice-floe on the morning of July 14. Meanwhile, Andrée's good humour finds expression in a note respecting an enormous polar bear which is visible 100 feet directly below them. The bear got out of the way of the guide-ropes, and went off at a jog-trot as soon as he got up on to the ice. "He did not try to climb up to us!"

According to the common calculations of Andrée and Strindberg, the expedition had now travelled about 75 miles in a direction which was approximately N. 60° E. due course, i.e., 37 miles northward and 65 miles to the east, and, consequently, they had now reached 82° 35′ N. lat. and 22° 5′ E. long., counting nine miles to the degree of longitude. According to the checking computations and calculations, an account of which is given hereafter, the position, however, would correctly have been 82° 29′ N. lat. and 24° 13′ E. long.

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[1] As the numbers of these buoys have not been given, it is difficult to say whether any of them have been found or not. See a later commentary in this connexion.—*Ed.*

Through the fog, the ice and water now appeared to be raised up along the line of vision. This makes the water bewilderingly like the land, and deceived Andrée many times. The ice was beautiful and smooth, and Andrée believed it to be certainly not half a yard thick—lying, as it did, so low in the water.

The voyage through the air, which had begun so successfully, now seemed to be approaching its end. It is only 10.30 p.m. when the car again begins to strike the ice violently, and the fog is dense. The ice sometimes exhibits great pressure, and is sometimes smoother and covered with pools of melted water, while it is traversed by many channels. To crown their misfortunes, the long guide-rope breaks short half an hour before midnight. There is no land in sight, and no birds, seals, or walruses can be observed. The only thing that can be caught sight of in the freezing fog is the ice with its large, open "leads" or channels.

And thus ends that fatal thirteenth of July!

JULY 14.

THE first few hours of the new day pass amid the same comfortless monotony and the same hopeless conditions. We are struck by the scarcity of the notes as compared with those written before. In a few, brief words, the ice is characterized as being beautifully level, and divided by much open water, although there are no great expanses of sea. It seems not improbable that, during the last few hours, when the dense fog does not lighten, when the balloon does not rise and allow them to sail onwards, and when the car constantly strikes against the ice during the course of a slow drift towards the north-east, Andrée is considering the idea of breaking off the balloon journey and descending. He therefore pays special attention to the ice and looks for some sign of land.

Just before 1 a.m. he writes a monotonous succession of "touch," a fresh "touch," another "touch." The only sign of life that displays itself is one of the pigeons which had previously been sent off, but which had returned, and now flies about the balloon. "Perhaps it has done the same as Glaisher's[1] pigeon!" says Andrée, when he notes this curious event.

The few remarks become still briefer. Between 1.34 a.m. and 5.37 a.m. nothing can be read except: "Adjusted the steering arrangement at its maximum southwards . . . course N. 80° E., 3.15 a.m. [= 2.23 a.m.] immediately after the side sails had been cut loose" . . . and some indications of the course.

From this we should be able to deduce that certain attempts had been made to get the balloon into a better position with such help as was offered by the steering apparatus and the sails. But this, too, had been unsuccessful.

Finally, there is an entry: "6.20 [= 5.28 a.m.] the balloon rose to a great height, but we opened both valves and were down again at 6.29 [= 5.37 a.m.]" At 8.11 p.m: "We jumped out of the balloon."

Respecting these words, the last written during the Eagle's flight, it should first be remarked that "8.11 p.m." undoubtedly contains an error, and that "p.m." should be "a.m." It would then be 7.19 a.m. by Greenwich Mean Time. In Strindberg's almanac we read: "Anchored on an ice-floe 7.30 a.m. July 14—19h 30m." These last figures give the astronomical time, and correspond to 7.22 a.m.

The times given also show that Andrée, Strindberg, and Frænkel did not leave the car until more than an hour and a half after the valves had been opened in order to bring down the balloon from the height to which it had unexpectedly risen. What happened during these ninety minutes is unknown. According to a note in Andrée's diary for the fifteenth, the balloon, on descending, was heavily weighted with ice, formed from the fine drizzle issuing from the fog.

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[1] James Glaisher (1809-1903), English meteorologist and aeronaut. Andrée evidently refers to some similar experiment with pigeons.—*Ed.*

The landing must have taken place successfully and in the very best way. This is shown, partly by the circumstance that, as will be seen in the following pages, the members of the expedition carried with them quite uninjured on their wanderings across the ice even the most sensitive instruments in their equipment, and also partly by the fact that the remaining pigeons were also saved in their baskets, as it is stated that it was not until the morning of the twentieth that they flew away.

Andrée's Polar Expedition in the Eagle is now ended. Tired and famished, the three men landed on the treacherous floating ice at about 82° 56′ N. lat. and 29° 52′ E. long. Gr.

On the basis of Andrée's and Strindberg's own words, words risen from the dead, we have followed the varying fortunes of the expedition during the 65 hours it journeyed in the Eagle. We have been able to follow the drift of the balloon hour by hour, and have become acquainted with the actions and words of those on board, from the instant when, amid ominous signs, they left Dane Island and, delivered into the capricious hands of the winds, disappeared amid the clouds for ever from the eyes of their countrymen, until the moment they landed on the ice, more than 180 miles from the nearest land—that, too, frozen and inhospitable! We have come to know Andrée and his comrades as calm, courageous men, not only during the few hours of quiet vouchsafed to them, but also amid days and nights filled with danger and hardships.

VII

The March over the Ice Towards Franz Joseph Land

Worn out and famished, Andrée and his companions landed on the ice-floe just before 7.30 o'clock on the morning of July 14. A checking of the place-determinations made at the landing-place shows that it was situated in 82° 56′ N. lat. and 29° 52′ E. long. Gr. In spite of fatigue and hunger the three men were unable to allow themselves any rest. Seven hours' hard work had to be done before they could refresh themselves.

What Andrée, Strindberg, and Frænkel now had to do was to make the first preparations for the phase of their expedition which now confronted them. Their first camping-place on the floating ice had to be arranged.

From what it is now possible to deduce, a division of labour for the making of notes and minutes was arranged on the very first day. Andrée describes in his diary the general course of the expedition; Strindberg, the physicist, keeps the logbook in which all the astronomical observations and their calculation are entered; Frænkel keeps the meteorological journal. At the close of his logbook Strindberg also enters the packing-lists, the stock-taking account, and the arrangements made for the meals. In his memorandum-almanac, so rich in information respecting the balloon flight, he also makes brief marginal notes on certain days. Finally he writes to his fiancée in shorthand, during the first days of the wandering across the ice, a couple of letters entered in his second logbook, containing descriptions of what had passed. It is from all these notes, but first and foremost from Andrée's diary, that the following chapter on the march across the ice has been compiled.

In his diary Andrée has noted down after each day's wandering, in short sentences, sometimes in but few words, the events and observations he considered most important. Sometimes he seems also to have made notes during the dinner-rest, or when the expedition, for one reason or another, stopped for any long time during its journey across the drifting ice. There is no chronological succession in the notes made on any particular day. Scientific observations, remarks concerning the happenings on the journey, the character of the ice, the arrangements made for the food, remarks about bears and birds, etc., occur next to each other in this document, in which the amazing fortunes of the expedition and Andrée's gallant figure stand forth in lifelike colours.[1]

No notes give us any detailed information as to what happened on July 14 after the landing. In his diary Andrée has left pages 21–23 and 25–26 blank, probably to fill them with a description of this on a later occasion when he had more time. But such a moment was never granted him, for we may be sure that every succeeding day was sufficiently filled with painful labour.

What was the spot like on which Andrée and his companions landed with the Eagle and from which, after a few days, they were to begin their long wandering and drifting with the ice? In the account of the balloon flight they have themselves made us acquainted with it.

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[1] A valuable aid in the attempt to give a connected and chronological account of the course of the expedition, based on the diary, has been obtained in part from Frænkel's meteorological journal, in which he has noted his observations with date and hour after the party had risen for the day and then after they had pitched camp, and also from Strindberg's "*repas pendant le voyage*" (meals during the journey) entered by him at the end of his Logbook II. In this book is given the hour of the different meals during the journey but, unfortunately, these notes embrace only the period August 4 to 15. Strindberg's extremely valuable stenographic entries are only four in number and conclude with an introductory description of the events of July 26. As to the hours given in the documents, Andrée's statements have been taken as referring to the same watch as the one he used during the journey of the Eagle and have, therefore, been reduced by, on an average, one hour in order to obtain the same Greenwich Mean Time which, it is evident, Strindberg and Frænkel employed. Possible errors of a few minutes in the approximate figures for the hours play no role at all, in the description of the general course of the expedition.

The Eagle descended on a sea filled with drifting ice. The three men were now so far towards the north, and had penetrated so far amidst this pack-ice, that floes of different sizes and shapes formed connected fields of considerable extent. Leads, or channels, varying in length and breadth, traversed the ice in different directions. It was also filled with hummocks of pressure-ice, some long and high, some short and low, formed by the pressure of the drifting ice. As it was high summer, the snow had melted to such an extent that great expanses of the ice were covered with pools of water. It was this alternation of snow-covered and naked ice, of pools of water and leads, which had several times during the course of the balloon flight led the polar travellers to believe that they had open water beneath them. There were, however, no very great stretches of such water, but here and there extended large and level surfaces of ice. The three men were surrounded by this chaos of ice, ice moving and drifting, pressing and twisting, sometimes breaking asunder into large leads, sometimes assembling into far-stretching masses. For hundreds of miles in each direction spread this scene. Such pack-ice, which is neither ice nor water but a mixture of both, is one of the most fearful expanses a man can ever traverse.

On July 14, the day when they landed, the three men finally rested after midday, between two and three o'clock. The next day, July 15, they rose about eleven. Arctic weather prevails. The sky is entirely covered with clouds and a fine drizzle is falling; the air is fairly clear, however; the temperature remains at about freezing-point and there is a calm or perhaps a faint north-west wind is blowing. According to the charts Andrée had with him, and which formed part of the find from White Island, there lay at a distance of 192 miles from them, in a south-south-west direction, North-East Land—belonging to the large Spitsbergen group of islands. In a south-easterly direction, at a distance of 210 miles, was Franz Joseph Land, where Fridtjof Nansen spent the winter of 1895–1896 with his companion Johansen, and from which he returned to Norway as the world-renowned leader of the *Fram* Expedition. On the English chart appeared "Gillis Land," which was nothing other than the Giles land (=White Island), named after the Dutchman Giles. It had been placed by the discoverer in an approximately correct position, but later on, in consequence of a misunderstanding, it had been erroneously placed not less than one and a half degrees of latitude farther towards the north. The actual Giles Land, now known to the world as White Island, was given as New Iceland. No human being had hitherto visited the expanse lying between the Eagle's landing-place and the groups of islands just mentioned. Andrée could, consequently, very well imagine the possibility of some unknown land presenting itself to his sight. We shall often find him on the lookout for such land.

In view of these circumstances, one of the most important resolutions made during the entire expedition had now to be taken: a resolution which was of decisive importance for the fortunes of the three men. They had to determine whether they should remain in the place where they were, and drift with the ice, or begin a journey across it. In the latter case they had also to determine towards which land they should go. After the unwritten pages in his diary, Andrée, on the fifteenth, respecting this fateful deliberation, enters merely the words "determined to set out from the point where we were." Nothing is mentioned as to where they thought of directing their steps, but from the succeeding remarks in Andrée's diary it is possible to deduce that they had fixed on Franz Joseph Land, and Strindberg's shorthand notes for July 22 say that they are starting for Cape Flora in the archipelago in question. The reason for this disastrous determination was probably, first and foremost, that at the point mentioned there was a large depôt for the expedition. In addition, Franz Joseph Land, in consequence of Nansen's wintering there, was known by Andrée and his men to be a place where it was possible for human beings to support the cold and darkness of the polar winter. Finally, the island-group offered much of scientific interest, both of geographical, geological, and other natural conditions. This latter fact was, most certainly, of no small weight when the expedition determined to direct its steps to Cape Flora. They did not know that their attempt to reach this goal would be prevented by an invincible ocean current.

Andrée and his companions having made their plan, preparations were commenced for the sledge journey. We know from a preceding chapter that, considering the possibility of such a journey, Andrée had taken with him in the Eagle a complete equipment embracing among other things three sledges, a canvas boat, a tent, a sleeping-sack, arms and ammunition, provisions for about six months, etc.

As we have already seen, 440 pounds of the provisions and equipment (including the "scraper"), were thrown overboard during the balloon flight. But the main part of the equipment, weighing altogether many hundredweight, still remained uninjured in the car which stood there on the ice.

The whole of the week which followed the landing, i.e., the period July 15–21, is spent by the expedition on the ice-floe on to which the Eagle had descended, preparing for the journey over the ice by putting in order the sledges and the boat, and packing everything they considered they ought to take with them. These days, when the three men did not seem to entertain any doubt of a favourable termination to the plan they had made, were, in spite of all the work, calm and filled with a sense of security. After the exertions of the balloon flight, the fifteenth and sixteenth seemed to Strindberg to be really agreeable days. Nor is the party alone there on the pack-ice. An auk flew past them to the south-south-west; they saw a fulmar and as early as on the fifteenth, a bear. A fulmar thought nothing of driving away and pursuing one of the pigeons.

On July 16, weather prevails similar to that of the day before, but the fog seems to be denser and the south-westerly wind somewhat stronger. The ice begins to pack. In the evening the first snow falls, but not in great flakes. The night before the seventeenth the snowfall continued.

July 17 is passed in the same way as the sixteenth. The next day the air is clearer and visibility becomes greater. All the pigeons had flown away in the morning. The three men look out for land but none is seen in any direction. On the other hand, they observe seals and a fulmar. July 19 makes its entry with the same weather. Andrée notices how the netting of the balloon on the ice has sunk into the 29-inch-thick layer of snow which covers the surface. Twice Andrée goes up on to the roof of the car of the fallen balloon and examines the horizon carefully in every direction. But no land meets his eye. Nothing but a great auk is seen to the east of the camp. But the day was to be marked by a great event. At six o'clock Andrée shoots his first bear. It had come from the north-east. The welcome booty is cut up and the offal thrown into a lead or into a pool of melted snow on the ice. Within half an hour two fulmars make their appearance to enjoy the remains. An auk, too, swims about in the water near the camp but becomes frightened and flies off to the north-north-west.

On July 20 the weather seems to have been clear and the wind has swung round to the south-west, but the temperature still remains at about freezing-point. In the sunshine the expedition gets some of its things dry after the fog, drizzle, and snow of the previous days.

The next day, July 21, preparations for the journey over the ice are so far advanced that the sledges can be packed. The canvas boat they have brought is tested in the sea with excellent results. Nils Strindberg now begins his duties as the cook of the party, an occupation fully as responsible as the one he had formerly carried out as astronomer. He fries some pieces of the bear's-meat very cleverly over the Primus.

"Do you want to wash yourself, Nisse?"

"Wash myself? No, I washed myself day before yesterday. What's left is the kind of dirt that sticks on by itself."

During the week they remained on the landing-floe, according to Strindberg's observations (which have now been checked), up to midnight between July 19 and 20, they had drifted with the current not less than 18 miles in a south-south-westerly direction and, from then until the afternoon of July 21, about 4.8 miles to the south-east.

On July 22 there is fog again. They give the last touches to the packing and about 7 p.m. the sledges stand ready and the three men are prepared to start.

Then they begin their march. At last they are off! Strindberg wonders if they shall succeed in reaching Cape Flora, for the sledges are very heavy to pull.

Now the three men learn what it means to travel across the polar ice. A little mishap occurred at the very start. When they were about to leave their ice-floe with their first sledge, this ran askew and slipped down into a pool of melted snow-water. Strindberg stepped down into it up to his knees and held the sledge fast to prevent its sinking. Andrée and Frænkel went across to the other floe, and they succeeded in getting the sledge up, but Strindberg's sack which lay on top of it became, of course, wet through. There he had his letters from his fiancée and her portrait—his dearest treasure during the approaching winter. He knew by now that he would have to pass this in the polar regions without the possibility of communicating with his friends and relations in Sweden. After they had got the sledge up again they encountered leads, or channels, in which floated drifting ice-floes. With the assistance of these they had to pilot themselves across the water. This was done by bringing the ice-floes close to each other, so as to form a series of bridges. But it was slow work getting the big, heavy floes into motion and into the right place. When the party had at length crossed they encountered a large, open field of ice over which they could march two or three miles with their sledges without any great difficulty. But the sledges were difficult burdens, each of them being laden with between 300 and 450 pounds of equipment. During the course of the day it cleared up and the sun shone out. After having pulled their heavy loads some three hours, they had to alter their tactics and all three helped to pull one sledge at a time. After having made their way onwards thus for an hour they stopped and formed their camp on a picturesque hummocky floe. They raised their tent and all three lay side by side in the sleeping-sack. It was a tight squeeze but there was good fellowship. Before Strindberg fell asleep he wrote a letter in shorthand to his sweetheart, telling the events of the day. How much could he not have added about all that had happened that day. But he is tired and must sleep, and with a "good-night" he ends his first epistle from his pilgrimage over the ice. It is already midnight.

The next day, July 23, the three comrades awoke at 11.30 a.m. The weather at first was good, the sun shone from between the clouds, the faint south-westerly wind continued, and the temperature remained close to the freezing-point. Later on it became windy and misty.

The first thing to be done was to have a meal, then to break camp and pack everything on to the sledges. This took a couple of hours, so that they did not start until some minutes after one o'clock.

As on the preceding day, they at once encountered difficulties. It is especially troublesome and dangerous to cross the wide and difficult leads which now confront them. Andrée and Strindberg differ in opinion as to the plan to be adopted. Finally they seem to have determined to ferry themselves across, with the sledges lying athwart the boat. But this is very risky, writes Andrée. After having cleared some leads in this way and having followed the tracks of a bear on the ice between them, they snatch a hasty midday meal. Some birds, four auks, two ivory gulls, and a fulmar, break the monotony of the surroundings, where ice, water, and fog melt into one uniform oppressive dreariness. The snow is wetter than on the preceding day but the heaped-up pressure-ice—*torosser,* as Andrée calls them—are negligible. Towards afternoon the party finds ice on the pools of snow-water, but it could hardly have carried them. In spite of all difficulties they succeed after dinner in putting a mile or two behind them. About 10 p.m. they make their camp for the night in the shelter of a hummock, 13 feet high. Strindberg at once begins to prepare supper. He makes soup of peas, rusks, soup-tablets, and Rousseau meat-powder, but it was not good, the cook himself thinks, "for that Rousseau meat-powder had a bad taste." But one is not dainty up there amid the polar ice, so they managed to get the soup down. They had a little butter too. Just as on the preceding evening, Strindberg writes to his fiancée before he falls asleep. But the lines are few and the sentences short and broken. The day has been a hard one.

On July 24 the men break camp at 1 p.m. as they had done the day before; the wind is southerly but the temperature has fallen almost a degree below freezing and it is snowing slightly. Once more they encounter leads and pools of water on the ice, as well as hummocks. They march by the side of one such channel almost the entire day, but they are obliged to undertake difficult and dangerous ferryings across smaller fissures and leads. Andrée notices that the water in a little pool is salt. The most difficult things today, however, are the hummocks. The sledges turn slowly and they are strained to such a degree when they are drawn across these walls of piled-up ice-blocks, that fears are entertained for the durability of their material. Unheard-of pains are needed to drag the heavy sledges forward, although the weather is favourable and the snow on the ice firmer than the day before. The question is raised, consequently, of lightening them; but nothing is decided.

So begins a new day, July 25. It is the birthday of Strindberg's fiancée; a fourfold hurrah is given in her honour. At last at 12.30, after ten hours' weary work, they stop, utterly worn out after the tiring day. An open place on an ice-floe measuring not less than a thousand yards across is chosen as the camp for the night. In spite of fatigue, Strindberg sits down as soon as they have stopped, and in his neat stenographic hand writes his congratulations to his sweetheart, expressing his feelings on her festival day. His thoughts go to her and to his people at home. He wishes he could inform his dear Anna of his excellent state of health and let her know that she has nothing to fear for the well-being of himself and his comrades. They are certain to reach home at last. "Yes, how very much all this occupies my thoughts during the day! I have plenty of time to think and it is so good to have such pleasant memories and such happy prospects for the future as I have." A little later Strindberg continues his letter while he sits sucking a caramel, "a real luxury." He refers his sweetheart to Nansen's pictures so that she may get some idea of the scenery round about their little camp. There is nothing but ice—ice in every direction, hummocks and fissures alternating with melted ice, all everlastingly the same. For the moment, it is snowing a little, but it is calm at least and not very cold (30.5° F.). At home in Sweden, of course, the summer weather is more agreeable, thinks Strindberg, and so he goes on to his Anna: "Yes, it is strange to think that not even for your next birthday will it be possible for us to be home. And perhaps we shall have to winter here for another year more. We do not know yet. We are now moving onwards so slowly that perhaps we shall not reach Cape Flora this winter, but, like Nansen, will have to spend the winter in an earth-cellar." He suffers at the thought of the despair his sweetheart will feel if the expedition does not reach home even by next autumn. "And you can imagine how I am tortured by the thought of it too, but not for my own sake, for now I do not mind if I have hardships, as long as I can come home at last."

Between these two occasions when Strindberg is sitting writing, the three comrades enjoy their meal. Coffee was an additional luxury that evening. A bottle of fruit syrup was also brought out. Nils Strindberg "dripped it out," as Andrée expresses it, and he himself washed out the bottle twice to get the last of the syrup. Then Frænkel endeavoured to get a little further syrup taste out of it unnoticed.

Now the tent is in order, Frænkel has taken the meteorological observations and they are going to turn in. They are all rather tired. Before dropping off to sleep they have a short discussion as to their mental characteristics and faults. Then Strindberg finishes his letter and it becomes silent in the tent. But during the night heavy shocks are felt against the floe on which they are lying, in spite of the field being very large.

The men in the tent awakened the same day at about twelve o'clock, but as it was raining they stayed inside and slumbered, all three of them. Then they rose and Strindberg cooked a little food: cocoa and condensed milk; in addition, biscuits and sandwiches were eaten. It was not until between 4 and 5 p.m. that they were ready and started. Now they employed a new method of travelling amid the fog through the wet snow and across the bad terrain, and tried to make their way onwards alongside of the water-channels on as smooth ice as possible. But they fared no better in that Nils Strindberg "fell in" and was in imminent danger of drowning. He was dried and wrung out and dressed in knickerbockers. In spite of all this they are in good humour, and the three comrades keep up a really cheerful conversation the whole day. Andrée talks of the events of his life: how he entered the Patent Office, etc. . . . The first Ross's gull appears and, in the leads, the seals are frequent although they are never observed in numbers together. This leads to conversation about seals in general. Suddenly they find themselves in front of a wide channel and stop. Andrée and Frænkel go on a reconnoitring-tour, while Strindberg remains with the sledges. He sits down and again writes a few lines to his sweetheart. He dreams of how things are, there at home. "Here one day passes like another. Pulling and drudging at the sledges, eating and sleeping. The most delightful hour of the day is when one has gone to bed and allows one's thoughts to fly back to better and happier times. But the immediate goal now is our wintering-place. We hope to find things better in the future. Now the others are coming back and we shall continue the drudgery with the sledges. Au revoir. . . ." During the night, a big and a little bear paid a visit to the camp. Of this their tracks in the snow bore witness the next morning. On July 26 a great alteration took place. According to Strindberg's place-determinations, they could only have come a poor mile or two, in an east-south-easterly direction, since the afternoon of July 21. Andrée and his companions perceived, too, that they were no longer able to pull such heavily-loaded sledges as before. The plan of the journey must be revised, and, according to Strindberg's last shorthand note, the equipment was to be so divided that each of them could pull his own sledge. The method they had hitherto employed of pulling forward one sledge and then going back to fetch the others in turn cost too much time, and was too laborious. For this purpose they determined to part with some of their provisions and equipment, but it is with strange feelings that they face this necessity.

They started about 5 p.m. with a rafting, but when they reached the other side they stopped and devoted the remainder of the evening and the whole night to carrying out the alterations that had been agreed upon. The sledges, which were in a very bad condition and broken here and there, had to be looked at and mended. An effort was made to sheathe them with iron.

Then there was a stock-taking of the supply of provisions. The first of the equipment lists that appear at the end of Strindberg's logbook has no date, but refers in all probability to the stock-taking now in question. He has put down.

PROVISIONS

72 *large tins biscuits and bread*
14 *small tins biscuits*
2 *boxes Bovril*
1 *Pemmican*
73 *milk*
12 *Lactoserin*
24 *Rousseau's meat-powder*
20 *Butter*
13½ *tins Cloetta's pow. cocoa*
9 *large round* (5 *butter* 4 *whortleberry*)
1 *apples*
1 *sugar*

1/4 OF THIS =		1/5 OF THIS =
18	*large*	14
4	*small*	3
18	*milk*	15
3	*Lactoserin*	2
6	*Rousseau*	5
5	*Butter*	4
3	*Cloetta*	3
2	*large round*	2

Whether it was the fourth or the fifth part of the remaining provisions they had determined to take with them is not stated. What was taken, however, was calculated to last 45 days.

In addition, it is of very great interest, in considering the course of the expedition, to read the lists left by Andrée, partly of what his own sledge carried before and after the re-arrangement, and partly of the contents of Frænkel's sledge after reloading. The main portion of the articles given in these lists is included in the finds from White Island.

LOAD ON ANDRÉE'S SLEDGE, JULY 26, BEFORE ALTERING LOAD:

	lbs.
4 *ice-planks*	18.7
3 *bamboo-p*[*oles*]	4.4
1 *bearing-ring plank*	2.2

LOAD ON ANDRÉE'S SLEDGE, JULY 27, AFTER ALTERING LOAD:

	lbs.
1 *basket provis*[*ions*]	90.2
1 *do.*	115.5
1 *sack private*	34.1

LOAD ON ANDRÉE'S SLEDGE, JULY 26, BEFORE ALTERING LOAD:

(Continued)	lbs.
1 *boathook*	3.3
1 *bottom-tarpaulin*	2.2
1 *sack private*	38.5
1 Δ *basket*	64.
1 *pot boot-grease*	7.75
1 *hose*	7.75
1 *large press*	17.5
1 *shovel and* 1 *reserve cross-piece*	4.
1 *basket with contents*	143.
1 *do.*	146.
	459.3
grapnel with rope	4.4
	463.7

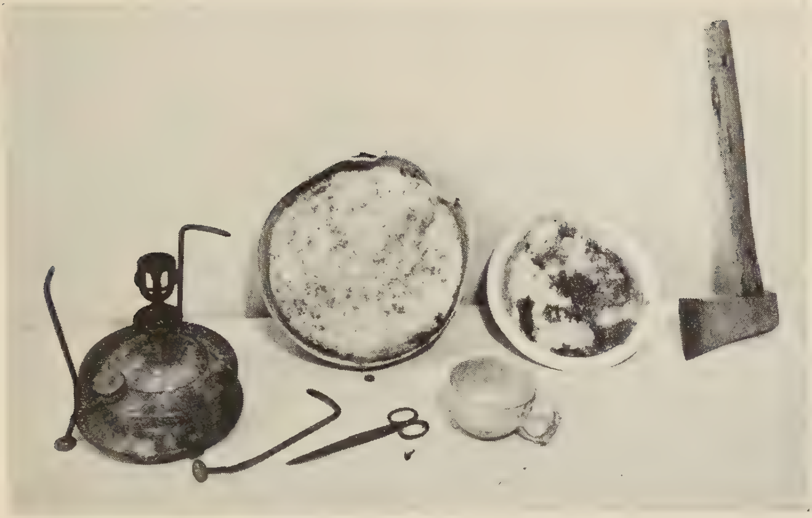
LOAD ON ANDRÉE'S SLEDGE, JULY 27, AFTER ALTERING LOAD:

(Continued)	lbs.
1 *do.,* ½ *private*	7.7
	247.5
1 *medicine chest*	19.8
	267.3
1 *tent*	17.6
	284.9

LOAD ON FRÆNKEL'S SLEDGE AFTER ALTERING LOAD:

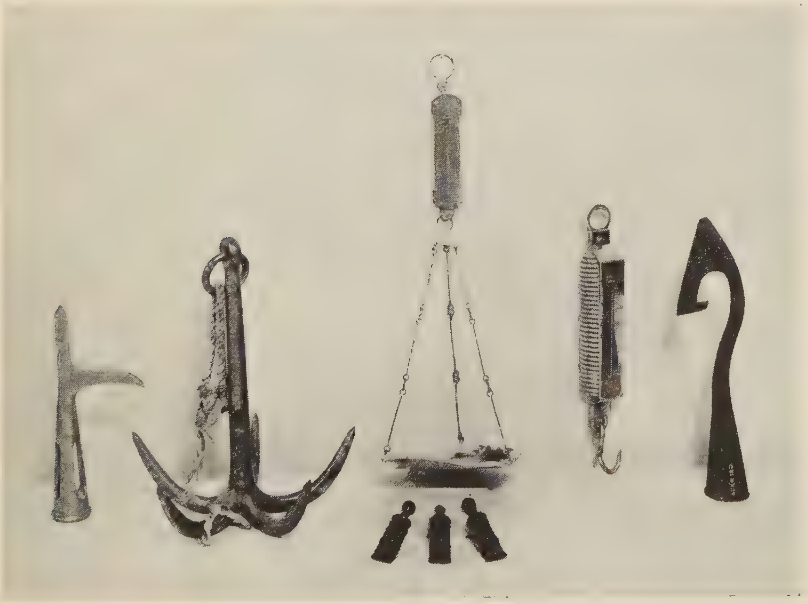
Boat	138.6
1 *sack private*	37.4
ammunition	38.5
Altazimuth	6.6
stand for do.	3.3
Div. instruments	17.6
Div. charts etc.	6.8
1 *photogr. app.*	1.7
1 *cooking-stove*	8.8
1 *field-glass*	2.6
3 *blankets*	9.9
sleeping-sack	19.8
matches	6.6
	298.3

From these lists it is apparent that the weight of Andrée's sledge was reduced from about 464 lbs. to 285 lbs. and that Frænkel's

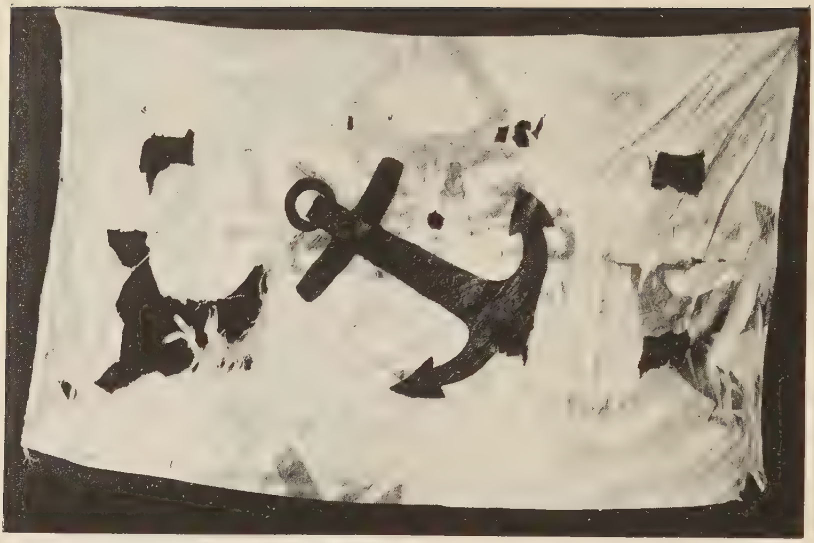


DOMESTIC UTENSILS

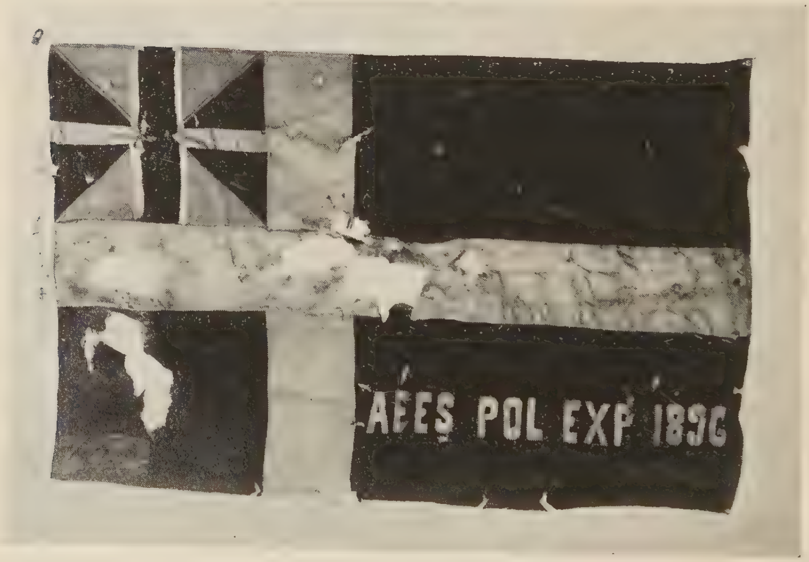
Left, the Primus stove, which still contained paraffin when found



BOATHOOK, GRAPNEL, SPRING-SCALES, HARPOON, AND WHISTLES



THE BALLOON FLAG


AEES POL EXP 1896

SWEDISH FLAG WITH THE UNION MARK CARRIED BY THE EXPEDITION sledge weighed about 298 lbs. Strindberg states in his almanac that his weighed the same as those of his companions. Of the provisions that were left the three men ate during the course of the day as much as they could get into their stomachs. "Great indulgence in food on making reduction," writes Andrée. The day is marked by other events as well. Strindberg shoots his first bear and bear's-beef is found to be excellent after the meat has lain in sea-water for an hour. But what gave them the greatest pleasure was the wind, which had now swung round from southerly to northerly. "Hurrah," cries Andrée at this change, because of which he hopes the ice-drift will become southerly and will help them onward towards their goal.

After the rafting which took place immediately upon starting from the camping-place, there was no time for any further march, for it was not until six in the morning that the repacking was finished and they could go to rest.

When they wakened the same day, July 27, about 3 p.m., still another alteration was made in the packing. The meat-powder and the like were further reduced and more bread was taken. This was probably the result of Frænkel's having an opportunity of shooting another bear which, together with the one killed the previous day, supplied the expedition with a considerable addition to their meat-reserves. In spite of a whistle and a hunting-horn being used, the bear in question had not been frightened, and Frænkel was able to put in a beautiful shot at a distance of 125 feet. Not only was the meat useful, but the skin, too, was saved to mend the sleeping-sack with.

At last, towards midnight of July 27, they are ready to start. When they leave their camping-place and everything they have determined to part with, they open a bottle of champagne and eat a few biscuits and honey. Presumably this bottle had been intended for a more joyous event than the one which now faced them. But it is encouraging to see with what sunny humour and enthusiasm they move away from their belongings and their provisions, ready to fall back on the uncertain bears and birds which they might shoot to replace the food they saw they were unable to carry with them. They give a cheer for the Swedish flag, which they have brought with them from the balloon and which now flies over the sledges. Then they empty the bottle of champagne, and Andrée sweeps the tent with the straw-wrapper of the bottle. It is characteristic of Andrée and of his way of keeping his diary that, immediately after the note respecting the solemn ceremony with the champagne, he puts the remark "sennegrass [1] between the stockings." With all their simplicity these words illustrate, far better than long elaborations, the expedition's struggle for existence, and all the care that had to be devoted to its equipment so that it could continue on its way towards land and safety.

A north-westerly wind had now risen and was greeted with joy, as they hoped it would cause a drift of the ice in the desired direction. Their journey that night was a heavy and fatiguing one, however, for not less than fourteen leads had to be crossed. They were able to pass one by means of rafting on ice-floes; in two other instances it was impossible to move the pieces of ice, and the boat had to be employed instead. This day the temperature had fallen to 30°–29° F., so that ice had formed on the pools of water and cut into the boat, thus making rowing almost impossible. The frost had brought about one improvement, however, as the ice-edges along the leads and pools, which had previously been eaten away by the water, now grew firmer. But the country across which they journeyed was extremely difficult on account of all these channels and the hummocks of pressure-ice. Strindberg's sledge broke during the course of the day, but Andrée and his comrades were satisfied with their results when they at last crept into their sleeping-sack on the morning of July 28, after a day of fatiguing labours. Even Frænkel complained of weariness, adds Andrée.

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[1] A grass gathered by Laplanders and dried for use in their shoes, to give additional warmth.—*Trans.*

All hands were awakened at 7 p.m., July 28. First of all, the sledges had to be looked to and sheathed, and some of Frænkel's gear needed repair. At first the going was dreadful, but in the evening they had magnificent ice to cross, and the weather, too, was excellent. "Paradise: large smooth ice-floes without humps or leads or more melted snow-water than was needed for drinking. Parade-ice,"[1] writes Andree, and he cites Frænkel's words, that "what old Mother Nature sends us is pretty good after all." The fresh wind is bitingly cold, but still it is welcome as long as it drives the ice towards the south. This day, the men began to wear snowshoes. A number of bear-tracks were passed, but not a single lead had to be crossed. Then, suddenly, they encountered a channel, "a broad beast," and a halt was made. At eleven o'clock, July 29, all go to rest after having been at work sixteen hours. "We learn the poor man's art: to make use of *everything*. We also learn the art of living from one day to the next." After Andrée has made some further notes, evidently intended as an aid to memory for a later, more detailed account of the journey, it is time to sleep.

After a rainy and windy early part of the night, they rise before one in the morning of July 30. The day begins as usual with greasing boots. The division of labour in the camp is now carried out in its entirety. Strindberg is the cook as before, and Frænkel has been given, in addition to his meteorological service the task of housemaid, too, to arrange the tent and lay the table. While they break camp, Frænkel puts away the beds in the tent and Strindberg boils and fries, while Andrée reconnoitres the surroundings in preparation for the day's march. The hunting-booty is now used in such a way that bear-steak is prepared twice a day—at the start, and after arriving at the next camping-place.

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[1] A better pun in Swedish than in English.—*Trans.*

The sleeping-sack makes its presence felt: as it is made from reindeer-skins, reindeer-hair is encountered everywhere. "Lose one, you find a thousand," asserts Andrée. The day was extremely fatiguing, a great number of water-channels having to be crossed. The party makes use of every method in doing this. Between the leads, however, the ice, which was very thick, was good, so that in spite of everything they cover a rather long distance. But on the smooth ice, too, there existed treacherous collections of melted snow-water, and Andreé "flopped" into one of them. Things were worse, however, when Frænkel began to suffer from snow-blindness. A factor of the very greatest importance was that the direction of the ice-current now proved to be carrying the expedition away from the course it wished to follow. In order to reach Franz Joseph Land they were obliged, as already mentioned, to keep a south-easterly direction. But as the current carried them southwards, and even with a slight trend to the west, the travellers this day determined to go towards the east. Their plan was to continue in this direction, in order thereby to progress in the direction of the resultant, or median line, between the ice-drift and the course of their march.

An additional note which Andrée considered worth making was the following: While Strindberg was preparing a dish of Mellin's food, Frænkel asked what was up. On being answered "dessert," Frænkel said "Jolly, then it must be eaten!" Strindberg determined to try to get his hands clean. He washed one of them with a wet stocking, but found the task so difficult and time-wasting that he let the other hand be. "The difference was like that between a mulatto and a nigger," says Andrée. About 2 p.m. they at length retired to rest, quite worn out.

On July 31 the expedition started at 4 a.m. A dense fog prevailed, which prevented them from choosing the best way, and they were compelled the whole day to force their way onwards across a very difficult terrain. Not less than ten channels had to be crossed during the first six hours. To complete their misfortunes, the snow that day was deep. “Tramp on our knees in deep snow. Tramp—tramp on our knees. The discoverer of the joys of flopping = Nisse,” writes Andrée in reference to this march, which must, of course, have been tremendously fatiguing. Not only snow and open leads, but also treacherous water-soaked portions of the ice, half-frozen and snow-covered, placed repeated hindrances in the way of the three men’s onward march towards their distant goal. They also came into an enormous belt of pressure-ice, a couple of miles wide, and there was nothing else for them to do but to hew their way onwards. Thus passed the whole day. It was not until evening that they got clear of the hummocks and progressed a good distance to the east. But their courage and vitality do not diminish, nor the good humour of the three comrades. “The polar district is certainly the source of the idea of the stumbling-block,” writes Andrée. During the course of the day the fog lightened and the sky cleared. They then climbed a lofty, pyramidal block of ice to reconnoitre, but saw neither land nor sea. The ice, which in certain places measured 13½ feet in thickness below the water, had, here and there, been cleared of its covering of snow, so that it lay bare and in many places was soiled by particles of clay. Andrée noted that in such places the melted snow-water had not such an insipid taste as the pure snow-water, but contained a slight taste of clay. Larger quantities of clay were also observed upon the ice, and were found to consist of grains of varying form, sometimes as large as a walnut. Samples of these were taken for a later scientific investigation.

Towards the evening they followed the fresh track of a large bear. This animal had also slipped down into the “soup,” as Andrée terms the pools of melted snow-water, “so that not even he is above making mistakes in this regard.” A Ross’s gull, an ivory gull, and some fulmars make their appearance. These are the only birds that have been visible during the last few days.

At the camping-place, towards evening, Strindberg makes an astronomical place-determination, the result of which shows that they are now in 82° 22′ N. lat. and 29° 12′ E. long. Gr. These calculations show, on being compared with the previous ones, that the expedition has drifted with the ice towards the west more quickly than they have marched towards the east. "This is not encouraging," writes Andrée, "but we shall continue our course to the east some time more, as long as there is a bit of sense in doing so. . . . Out on the ice one cannot at all notice that it is in movement, except that at our resting-places the leads change while we are sleeping."

At last, at 6 p.m., they crept into the sleeping-sack.

At seven o'clock that day, the last of the month in which they quitted Dane Island in the Eagle, Strindberg has an opportunity of writing some lines to his sweetheart. It was then a pretty long time—from July 25—since he spoke to her last and much had changed since then. He begins by describing the determination to alter the loads on the sledges. Then it is clear he was interrupted and after this he wrote nothing more to her whom he constantly had in his thoughts and to whom he was so glad to address his words during the first days on the ice. The situation of the expedition, every day becoming more difficult, the ever-increasing efforts its members must make to save their lives, were enough to prevent him from continuing to note down his impressions.

Sunday, August 1, is ushered in with beautiful weather. Andrée, Strindberg and Frænkel rise at 5 a.m. Frænkel takes his meteorological observations. The temperature is 32.9° F.; a faint north-westerly wind is blowing, and cirro-stratus clouds cover no more than ten per cent of the heavens.

After Andrée—as on the preceding days—had greased his hands with bear-blubber in order to keep them soft, and while Strindberg and Frænkel pursued their work—the former as kitchen-maid, the latter as housemaid—Andrée makes a very careful study of the stratification and structure of the ice, and sketches one of the two leads which ran, the one in a N. 40° W., the other in a

N. 30° E. direction. Then he mends the sleeping-sack with bearskin.

At half past seven they were ready to start and had extremely good ice until midday, when they were given an hour's hard work in order to cross some hummocks. Then the ice became good again, and all day long they were not obliged to use the boat a single time to cross channels, for these were narrow and often provided with level edges. The cause of this favourable character which the ice now seems to have assumed is considered by Andrée to be that they are approaching the edge of the great Polar Stream, and that their territory lies to leeward of the tide-water under Franz Joseph Land.

Animal life is now becoming richer. Three Ross's gulls appear, two of them being fairly unafraid, unlike what has previously been the case. Fulmars and seals are common, and they cross two tracks of bears. In the evening they saw the back of a new animal which looked like a reptile 30 to 40 feet long, of a dirty yellow colour and, in Andrée's opinion, with black stripes running from the back for some distance down the sides. It breathed heavily, almost like a whale—"which I suppose it really was," adds Andrée. Later on in his diary he corrects this supposition, having come to the conclusion that it must have been a walrus he had seen.

In the afternoon between one and three o'clock, the fog grew denser but lightened later on, so that the zenith became clear, while it hung round the horizon in the form of a light mist. The day was one of the richest in results. Andrée estimates the distance they covered at 4.2 miles; Strindberg at 4.8 miles.

The remarkable thing, however, is that the correction of Strindberg's astronomical observations shows that, during this and the following day, they did not advance at all in the desired direction, but drifted back towards the north instead.

In agreement with what had now become the practice, they used a medicine-chest, a photographic apparatus, and a case of matches as seats when they took their supper that evening. A slight uneasiness probably made itself visible, for their supply of bear's-meat was almost finished.

Andrée's last note in his diary for August 1 is that "stockings are dried best by putting them on over the wool-and-hair stockings on the feet" and he adds that his chronometer probably loses 4.7 seconds per day.

On August 2 the comrades awoke at half past eight more tired than usual. "It seems as if good country were more fatiguing than half good," says Andrée. For breakfast, Strindberg cuts the last piece of bear's-meat into small pieces, "so that it might at least *look like* being a lot."

When they started at about eleven o'clock, it had cleared and was quite calm, so that it felt warm, even if the temperature in the shade kept a degree or so below freezing-point. Scarcely an hour after they had broken camp a fresh bear came within shooting-distance. In their eagerness, both Strindberg and Frænkel missed, but Andrée dropped the bear with a single shot in the breast at a distance of 125 feet. It proved to be an old, worn-out he-bear with rotten teeth. On this occasion they took the fillet, too, and in addition the kidneys (3 pounds), the tongue, and the ribs. As soon as this was done a skua became visible, two gulls made their appearance and circled round the remains of the bear. Andrée and his comrades now hoped that a fresh bear would be enticed to follow them by the carcass of the one that just preceded him, "so that we shall always have fresh meat at our heels." The country had been extremely difficult the whole day, and Andrée believed that, in spite of all their drudgery, they had not gone more than 2200 yards in ten hours when they crept into their berths at one o'clock that night. Before going to rest, Andrée mended a stocking, and in connexion with the care of his own person he adds that today he had washed his face for the first time since July 11.

On August 3 they rose at eleven o'clock, after having been greatly plagued by the heat in the tent, for they still had sunshine and quiet weather. They determined, therefore, to "lie outdoors." When the old he-bear was brought to table, they discovered that it was "as tough as leather galoshes." The forks they used also appear to have suffered from the treatment to which they had been exposed, for "the story of their evolution," illustrated by the various specimens, was photographed. Frænkel's fork seems to have been in a bad case, for Andrée makes a new one for him.

After the work of breaking camp and packing the sledges, etc., they start. It is still so warm that they pull without any coats on. The weather also allows of drying clothes on a large scale. But the ice is terrible and extraordinarily difficult. It consists of small floes, separated by large hummocks and channels, while the leads are covered by new ice. The only advantage of the frost that has formed the new ice is that the edges of the ice close by the leads have become more solid. Against the still open water-surfaces they see that the air is filled with a fine rain of water or needles of ice. Their attention is also attracted by a piece of drift-wood a little more than a yard long, which is lying on the ice. They also notice a skua, a gull, and a Ross's gull.

As always, they are in good humour. Frænkel and Strindberg joke about Andrée's old bear of yesterday, which Frænkel declares to have been the oldest bear of the polar regions and probably "an escaped menagerie-bear." As they passed the traces of a bear with two cubs they were able to hope for tenderer meat to compensate for the old and tough steaks they had got from this ancient he-bear.

They constantly had to cross leads.

"Is it easy to get across?" asks one.

"Yes, it is easy with difficulty!" answers another.

Amid the jesting there ripens, however, one of the most serious and most weighty decisions for the entire expedition—that which Andrée and his companions now arrive at.

Because of the difficult condition of the ice, the expedition had been compelled all through the previous day to keep a more southerly course than the direct easterly one along which they had been trying to travel. The beautiful weather allowed them to make a place-determination during the course of the day, and it showed that their position was 82° 27′ N. lat. and 28° 30′ E. long. Gr. Assuming that Strindberg's observations are correct, the expedition, in spite of all its efforts, has advanced since July 14 only about 33 miles towards the south-south-west, and, since July 31, about 7.8 miles towards the north-north-west. The ice-drift has been too strong for them. These facts, so formidable in the light of their plans to reach Cape Flora, caused the party to discuss the situation with the greatest thoroughness. At one o'clock, early in the morning of August 4, Andrée reconnoitres in the extremely clear air, examining with his field-glass the horizon in the north, east, and south-east in search of land or sea, but without being able to find either. Nothing but ice, and difficult ice, is visible in all directions. "In consequence, we determined to abandon our efforts to move eastwards. We can surmount neither the current nor the ice and have absolutely no prospect of doing anything by continuing our tramp to the east. We have therefore decided to begin our next march in the direction of the Seven Islands, which we hope to reach in six or seven weeks."

What does this decision imply? To be able to form an opinion on the matter we must remember Andrée's remark on July 31 that "we shall continue our course to the east some time more, as long as there is a bit of sense in doing so." Now they are compelled by natural conditions to surrender this conviction and to give up their hopes of reaching the large depôt at Cape Flora. They choose as their goal, instead, the smaller depôt on the Seven Islands lying off the north coast of Spitsbergen. They hope to reach these after a journey of six or seven weeks. Since the start from the landing-place on July 22, the sledge journey has now lasted 13 days. They have devoted their best strength to this journey, first drawing the terribly heavy sledges, and then the same sledges when they had been made somewhat lighter. Now they change their course and their goal, and worn-out as they certainly must be, they see before them a month-and-a-half's march across the pack-ice before they can hope, with the help of the current, to reach land at the Seven Islands.

With this prospect before them they go to their berths at 3 a.m. on August 4. Andrée writes that the bread and rusks, etc., are wet through. The last entries for this day are an observation respecting the movement of the ice, and a scientific explanation of the phenomenon in connexion with the great Polar Stream, the existence of which had been proved by Nansen. A more eloquent testimony to their strength of spirit, unbroken energy, and unconquerable courage can hardly be imagined. The men who now stand upon the ice are the same we learned to know during the journey of the Eagle. Unheard-of efforts and hardships have not lessened their firm determination to bring their polar expedition to a happy conclusion.

VIII

Towards the Seven Islands

After the decision that determined the future of the expedition, which was reached during the night between August 3 and 4, Andrée and his companions rose about half past one in the afternoon. They had enjoyed a most necessary sleep. Three-quarters of the heavens were covered with alto-cumulus clouds; the temperature was a little above freezing-point, and a light west-north-westerly breeze swept across the ice.

The expedition stands face to face with a new phase of its existence.

Half an hour after rising, the party breakfasted on bear-beef, hardtack, lactoserin-cocoa, and biscuits. Then they broke camp, for the first time directing their steps towards the Seven Islands, the course lying S. 40° W.

This day, too, was a bad one. Andrée makes a number of notes on the thickness of the ice, which he gives as 3.46 feet, and he takes a sample (No. 3) of algæ from the foot of the ice. The men also notice that the easiest crossings over the leads are by the highest hummocks, the edges of the lead there being nearest to each other. "Of course, these bridges are terrible," says Andrée, "but still, they are bridges." Broad channels without an ice-floe but with heaped-up edges are the worst, and they are mentioned with a hearty expletive. But as long as there is no fog, they can manage.

After six hours' march, the three men take a plain dinner, consisting of biscuits, butter, and cheese, besides snow-water. For a further six hours they battle onwards; then they stop, pitch their camp, and take supper. It is four o'clock in the morning of August 5. Strindberg produces bear-soup and Potage d'Oseille (Stauffer), sandwiches, biscuits, and cherry syrup and water.

Afterwards, a complete inventory is made of the provisions they still have left.

STOCK-TAKING OF PROVISIONS AUGUST 5, 5 A.M.:

Hardtack	11 *tins of* 2.4 *lbs.*	26.4 lbs.
12 *biscuits*	12 *tins*	34.1
Mellin's food		33
Butter	17 *tins of* 2 *lbs.*	34
Chocolate powder	9 *tins of* 2.2 *lbs.*	20
Milk extract	10 *tins of* ½ *lb.*	5
Lactoserin	10 *tins*	5
Pemmican		6.5
Sugar		11
1 *tin Stauffer preparation*		10
Coffee		4.5
1 *tin chocolate*		
3 *tins lime-juice tablets*		
Whortleberry jam		2.2
9 *tins sardines*		
3 *tins paste*		
Soup tablets	3 + *tins*	
2 *bottles syrup*		
1 *bottle port-wine*		
6 *Snowflakes*		
Flour		2.2
Salt	2 *tins*	
Cheese		1

Of these provisions, the following was packed on Andrée's sledge:

IN THE FRONT BASKET:		IN THE REAR BASKET:
Cocoa		3 *snowflakes*
Cocoa powder extract	4 *tins*	2 *Mellin's food*
Coffee	1 "	5 *biscuits*
Butter	5 "	2 *bottles*
Milk	8 "	4 *butter*

IN THE FRONT BASKET:
(Continued)

Lactoserin	4 *tins*
Bread	4 “
Sardines	5 “
Bird paste	1 “
Cheese	½ “

IN THE REAR BASKET:
(Continued)

1 *paste*
2 *salt*
2 *soup tablets*
1 *flour*
1 *Lactoserin*

On Strindberg's sledge was packed:

IN THE FRONT BASKET:

6.6 *lbs. cocoa powder extract (Mosquera)*
4 *tins butter* (7.9 *lbs.*)
2.2 *lbs. coffee*
1 *bottle raspberry syrup*
1 *Cracknel Biscuits*
1 *Albert* “
1 *Congo* “
5 *hardtack*
1 *tin sugar* (11 *lbs.*)
1 “ *Snowflakes*
1 “ *Stauffer preparation*
1 “ *chocolate and lime juice*
1 “ (2.2 *lbs.*) *whortleberries*
4 *small tins sardines*

IN THE REAR BASKET:

3 *tins Mellin's food* (19.8 *lbs.*)
2 “ *hardtack*
2 *Albert biscuits*
1 *Cracknel* “
1 *Oscar* “
2 *Snowflakes*
1 *pemmican* (6.6 *lbs.*)
2 *cocoa powder extract (Mosquera)*
4 *butter*
2 *milk*
5 *Lactoserin*
1 *paste (liver)*
1 *soup tablets*

“This stock-taking shows,” writes Andrée, “that we must be careful, especially with the bread.”

During the day, the temperature has fallen and is now 28.1° F. “The temperature is falling still lower and each degree makes us creep deeper down into the sleeping-sack.”

It is evening the same day. Fog prevails when the men creep out of the tent. They eat breakfast of mixed bear's-meat (ribs, chops, and kidney), bread (¼ piece), coffee, and biscuits.

They set out at 8.30 p.m. with the same course as the day before. Some drops of rain fall.

During the early part of the night, the expedition makes its way onward amidst greatly divided ice. Pools of fresh water and leads are frequent; after the low temperature of the night, new ice seems to have been formed on the pools. "Glassy ice-flop, or flop-flop," Andrée calls them. This cruising among the floes and crossing so much water made difficult going; sometimes they had to creep "on all fours today as in the spring of our youth." On several occasions Andrée notes the thickness of the fresh-water ice as amounting to 2¼–4 feet. In consequence of the ice being scattered and of the great amount of water, animal life is fairly rich. Large seals have crept up on to the ice, where, too, there are many bear-tracks, fulmars, and a Ross's gull.

Eight hours after the start they eat a dinner which is as Spartan as that of the day before, being only biscuit, butter, and bread in very scanty quantities.

The most remarkable event of the day, however, was probably their four hours' long rafting across an expanse of water or a lead which was about a mile wide. After this exertion of strength, the venturers were rewarded by having better ice and, towards the morning of August 6, even excellent ice. "Paradise," writes Andrée, "large level ice-floes with fresh-water pools full of syrup and water, and here and there a young polar bear with tender meat."

In the morning of August 6, at nine o'clock and after fifteen hours' labour, supper is served with approximately the same bill-of-fare as that for the preceding day—mixed bear's-meat and 1.6 pounds of bread and biscuits, with gruel made of Mellin's food. Then the three men rested; but towards evening they are once more afoot. Frænkel takes his meteorological observations. The sky is quite covered with clouds, and it is mild, 34.1° F. The wind has unfortunately swung round from northerly to the south-southwest. At 9 p.m. breakfast is served, once more with mixed bear's-meat, which is now more tasty, having become old; bread, coffee, and biscuits. After another hour or two everything is ready, and they set off with the sledges.

The ice is excellent, with large, level floes and many but easy crossings. "What joy when the needle pointed across a level of some hundred yards." The snow on the ice is troublesome, however, for it is granular and has a consistency like that of powdered sugar, so that their feet slip easily, while the sledges cut deep into the snow. But they are not altogether spared hummocks, for one large one, at least, running in a north-west direction, has to be crossed. When the sledges turned dreadful somersaults here, Frænkel made a pun which can best be translated: "The journey could not be called altogether hop-e-less." A new difficulty arises, too: the leads are found to alter while the expedition is making its way across them. Two Ross's gulls show themselves during the day, but they are shy. They approach the party only once and then fly away.

The dinner—if one may give that name to the small rations of bread, biscuits, butter, and water which are regularly eaten after the first six hours' wandering—is served at 5 a.m. on August 7. The chief meal of the day, supper, consisting of 2.2 pounds of bear's-meat, purée of peas (Stauffer), bread, and biscuits, is eaten at eleven o'clock.

Andrée considers that they have succeeded in travelling the longest distance covered thus far, probably not less than 3 minutes of longitude,[1] "but," he adds, "the wind is right against us and has probably driven us just as far back." They are very tired when they go to their berths an hour before noon. At 9.30 p.m. they at last awake and then feel quite refreshed. Fog still prevails; the wind has freshened, but has swung round more to the west (S. 70°–75° W.) and the temperature has fallen about one degree below freezing-point.

It is not until one hour after midnight that breakfast is ready:

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[1] About 3½ miles.—*Trans.*

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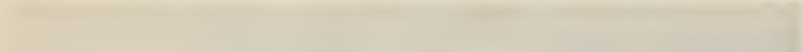
HUMMOCKS



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A LEAD IN THE PACK-ICE

THE EXPEDITION'S LEVEL-SEXTANT

THE "UNIVERSAL INSTRUMENT"
OR ALTAZIMUTH

ANEMOMETER AND MAXIMUM
AND MINIMUM THERMOMETERS

bear-cutlets of 2 pounds each with two pieces of bread, lactoserin-cocoa, and 6 biscuits each. "A little reindeer-hair in the food is recommended, for while taking it out one is prevented from eating too quickly and greedily." This hair came from the sleeping-sack.

At 2 a.m. they break camp. The ice is about the same as it has been during the two previous days. Hummocks and leads with large floes have to be crossed. It is warm work pulling the sledges, and Andrée wishes he had a summer jacket. Andrée himself does not use snow-spectacles except in strong sunshine; he keeps his eyes almost closed by squinting instead. The wind is cooling and is right against them, "but if it does what it has done before, i.e., closes up the leads, then it can keep on for a week or two." A couple of auks, with a call that Andrée has never heard before, are seen in a lead; two Ross's gulls also appear. A little later on in the day the expedition comes for a change into a dreadful country "where the fresh-water pools are often more difficult to pass than the salt-water channels, for their edges are eaten away below, and the depths are so slight that the boat cannot be used." A photograph is taken of this region of ice and water, and Frænkel, "who otherwise complains of the want of change, did not like what was offered him." In consequence of a permanent catarrh, the noses of all three are running.

At last, a little before noon, they allow themselves to have a proper meal, with three-quarters of a pound of bear's-meat and two pieces of bread per man, gruel made of Mellin's food, and biscuits.

On the next day, August 9, Andrée puts down the exact times for the different phases of their camp-life.

2.00 a.m. Primus started
2.18 the steak ready and the coffee-making begun
2.29 the steak eaten
2.48 the coffee made (1 heaping tablespoonful in
addition to the old grounds and 2½ pints

water and a little milk)
3.00 the coffee drunk
4.30 broke camp (course towards S. 40° W.)

Before they break camp, Andrée makes a sketch of the stratification of the ice and remarks that "the ice-sludge looks like old ice but one must not let oneself be fooled by that." Later on he sees a hummock of ice formed in a lead; this takes place at right angles to the direction of the wind which produces the pressure.

The going is dreadful and the country consists of large, uneven fields full of brown ice, new and old, large and small walls of hummocks between which there occurs an alternation of snowdrifts, collections of water-soaked snow, and pools of melted snow-water, but not many large leads. It is extremely fatiguing for the pullers; the snow, especially, is difficult, but "for the sledges the going is not difficult, for the snow supports them." Frænkel is attacked by diarrhœa for the second time and he is depressed both in body and spirit. Andrée gives him opium; both Andrée himself and Strindberg are tired out.

A skua was visible and a "fine beautiful bear approached us but fled before we had a chance to shoot. This was a great grief for us and a pity too, for soon we shall have no more bear's-meat left. Strindberg and Frænkel went after him but in vain." Strindberg's gun was out of order and they had several hours' work getting it right again. "Its mechanism is dreadfully carelessly constructed," remarks Andrée.

They have been awake and at work for eighteen hours when, at 7 p.m., they creep into their sleeping-sacks. That evening they have no bear-beef either, but content themselves with Cloetta's meat-powder, chocolate and bread, biscuits and butter.

On August 10 they have breakfast at eight o'clock. Then they make a complete list of the loads of the three sledges. As before, Andrée enters in his diary his own and Frænkel's lists, while Strindberg writes down his load in the logbook. The majority of the articles put down in these lists were in the find at White Island.

ANDRÉE'S SLEDGE	
1 *small sack*	7.7 *lbs.*
In front basket	81.7
In rear basket	82.0
1 *private sack*	34.0
1 *medicine chest*	20
1 *tent*	20
2 *tent poles*	3.3
meat	11
1 *gun*	3.5
1 *b. ammunition*	14.3
1 *sextant*	4.8
1 *photogr. sack*	13.2
	295.5 *lbs.*

STRINDBERG'S SLEDGE	
front basket	97.9 *lbs.*
rear basket	101.2
private sack	35.2
snowshoes, 3 pair	13.2
boathook	3.3
spade	2.2
grapnel with line	4.4
tool-sack	17.6
photogr. app.	13.2
theodolite stand	2.9
boot-grease	5.5
sewing kit	10.8
small field-glass	0.7
large field-glass	0.7
	308.8

FRÆNKEL'S SLEDGE		
Boat		138.6 *lbs.*
1 *private sack*		37.4
1 *hose*		7.7
3 *pieces wood*		4.4
1 *ammun[ition]*		7.7
1 *altazimuth*		6.6
2 *field-glasses*		4.4
3 *blankets*		10
1 *sleeping-sack*		20
1 *sack books*		6.6
2 *oars*		10
3 *poles*		4.4
1 *gun*		4.4
1 *sack shoe-hay*		2.2
1 *cooking app., food, etc.*		26.4
1 *case of matches*		6.6
1 *sextant*		4.4
1 *aneroid barom.*	1.1	10.1
1 *psychrom.*	6.8	
1 *change-sack*[1]	2.2	
Spirit, tableware, etc.		17.6
2 *cushions, guncase and cleaning-box*		3.7
1 *driftwood*		4.4
1 *tarpaulin*		5.5
		343.1 *lbs.*

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[1] For films.—*Trans.*

This stock-taking and the partial reloading which it involved made several hours' work. Strindberg also took an astronomical place-determination there at the camp, which gave the result 81° 56.5′ N. lat. and 29° 5′ E. long. Gr. "It is remarkable," writes Andrée, "that we have travelled so far in latitude, in spite of the wind having been right against us for several days."

It is not until about two o'clock that they start, and then, in consequence of the place-determination, their course for the day is S. 50° W. Today the terrain is extremely difficult, even if the going is good. They encounter absolutely untrafficable water consisting of broad channels filled with lumps of ice and snow so that neither sledge nor boat can be used.

Strindberg's observations having shown that the expedition has come south of 82° latitude, they celebrate at four o'clock by having sardines for dinner, in addition to the usual hard bread, biscuits, butter, and cheese. Then it began to drizzle and, towards evening, to snow.

Andrée is greatly interested by a find he makes on the ice, of small stones and leaves, etc. He describes the place in detail and takes samples. "This find should make it possible," says Andrée, "to determine where this great amount of brown and hard ice which we constantly see has its place of origin. Up till now, I have not found anything on the brown-yellow ice other than fine clay, and now I find on the same ice a whole consignment of plants, sand, small stones, etc."

After seven hours' terribly tiring march the expedition pitched camp. The same reason that gave them sardines at dinner, made the supper at 10 p.m. richer than usual, in spite of the supply of bear's-meat being very small. The bill-of-fare was as follows: bear's-meat (1.65 lbs.) with Batty's sauce, soup and biscuits, almond-tart (*Gâteau d' Amandes*) Stauffer. "Now Strindberg is sitting mending trousers in the seat, and Frænkel is oiling guns. Frænkel's stomach pains are now over." So end Andrée's notes for August 10.

During the last few days, Andrée's entries in his diary have been more detailed and connected than it was possible to make them before; during the days immediately following, they become still more detailed, and for the purpose of giving a continuous narrative of the wandering over the ice, they can be used to a far greater extent than has hitherto been the case.

August 11 began with nearly 4 degrees below freezing and a fresh north-easterly wind. After breakfast at 10.30 a.m., consisting of bear's-meat, bread, coffee, and biscuits, the expedition started. It was "a regular Tycho Brahe day.[1] First thing in the morning I got into the water, and so did my sledge, so that nearly everything became wet through. Strindberg ran into Frænkel's sledge and broke the boat with the grapnel. All the sledges turned somersaults repeatedly during the course of the day. Mine was twice turned completely upside down. The going was good but the country terrible. *All* imaginable difficulties happened, and when the evening came we were not at all happy. . . .

"A peculiar incident happened on crossing a lead. We stood quite at a loss what to do, for the edges of the ice were wretched, and the channel so shallow that the boat could not float. Our ordinary methods failed us altogether. Then, while we were talking it over, the ice-floe beneath Frænkel broke and so we obtained a bit of ice of considerable size, and with the assistance of this piece we then made the crossing quite neatly. We have not been able to keep the course, but have been obliged to go both to the north and to the east, but endeavour to go S. 50° W."

Something else happened, however; "Frankel shot an ivory gull." Andrée describes the bird in detail.

After having made some observations in the afternoon respecting the structure of the ice and taken a sample (No. 7) at the edge of a hole melted in the ice, Andrée states that Strindberg's place-determinations show them to be in 81° 57.7′ N. lat. and 30°

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[1] Unlucky day.—*Trans.*

long. Again they think they see Gillis Island, for Frænkel believes he has caught sight of land. It was so much like land that they turned their course in its direction, but then it was found to be merely a large and peculiarly shaped hummock, or wall of pressure-ice.

The place-determination according to Strindberg's observations, which have now been checked, is almost exact. Since the start towards the Seven Islands, consequently, the expedition had come 30 miles towards the south-south-west instead of to the south-west, although they had held the latter direction the whole time. It is also to be noted that, during these last few days, viz., between August 4 and 6, they had been at about the same place where the Eagle had been between 1.30 and 3 a.m. on July 12.

In the evening, some hours before midnight, the thermometer had fallen to 17.6° F., the lowest temperature so far noted during the entire journey. The wind had also swung round to the north-west and was blowing at a velocity of 25 feet per second. It was not until about 2 a.m. on August 12 that supper was ready. It consisted of bear's-meat (1.65 lbs.) and cocoa. The distance they made that day had not, according to Andrée's calculations, exceeded 2.1 miles. A month had now passed since Andrée and his comrades had gone on board the Eagle at Dane Island.

The three men rose at about midday on the same day. The temperature was still low and the wind west-south-west. Strindberg fried, in the usual way, the ivory gull that Frænkel had shot the day before and they found that it tasted excellent. Then they took a sounding through the ice, which was four feet thick, but bottom could not be found with their line which was 176 fathoms long. A sample (No. 8) was taken from the line when it had been drawn up 110 fathoms.

During the close of the day's march they at last got better country after the terribly difficult ice they had had during the last few days. The course had been S. 50° W. and, according to Strindberg's calculations, they were now so near Gillis Land, as it was called on the map, that the expedition might "well expect to catch a glimpse of it. But neither that nor any other land is visible."

The question of food now began to be pressing, as the expedition had only enough bear's-meat left for a single meal, and as an attempt to shoot a seal had failed.

It rains on the tent when they go to bed at 3.30 a.m. on August 13. Andrée thinks that, thanks to the better country, they had covered 2.5 minutes[1] that day, although the time under way had been shorter than usual. Andrée's boots now begin to be so cut to pieces that he fears "their fate will soon be sealed." The rain that falls also induces him to make preparations for manufacturing a waterproof.

The minute after they had crept into their berths they once more heard the loud breathing of an animal, which Andrée supposed was a whale, but later on recognized to have been a walrus.

On August 13, the last pound of bear's-meat was eaten at breakfast, and at 5 p.m. they set out. The ice was fairly good. They endeavoured to shoot a seal, but were unsuccessful. It was poor compensation to catch a little fish that Andrée observed in a lead. "It was hardly frightened at all and seemed astonished to see us." Andrée killed it with the shovel and gives a detailed description of it. Just when they had crossed the lead, Strindberg cried out: "Three bears!"—"We were at once in motion and full of excited expectation. Warned by our previous disappointments, we now went to work carefully. We concealed ourselves behind a hummock and waited, but no bears came. Then I chose myself as bait and crept forward along the level, whistling softly. The she-bear became attentive, came forward, winding me, but turned round again and lay down. At last it was too cold for me to lie still in the snow, and I called out to the others that we should rush up to the bears. We did so. Then the she-bear came towards me, but was met by a shot, which missed. I sprang up, however, and shot again, while the bears, which were running away, stopped for a moment. Then the she-bear was wounded at a distance of 80 paces, but ran a little way, whereupon I dropped her on the spot at a distance of 94 paces. My fourth shot dropped one cub. Then the third one ran, but was wounded by Frænkel and dropped by Strindberg, who had had a longer way to go, and so could not come up as quickly as I. There was great joy in the caravan, and we cut our bears into pieces with pleasure, and loaded our sledges with not less than 92 pounds of fresh meat, enough for 23 days. Among our experiments as to the value of the parts of the bear it may be mentioned that we found the heart, brain, and kidneys very palatable. The tongue, too, is well worth taking. The meat on the ribs is excellent. The work of cutting up the bears, etc., gave us so much to do that we did not travel far this day. The wind has now swung round to the southeast, so that we hope to drift westwards. Today the weather has been extremely beautiful, and that was a good thing, for otherwise the work would have been ticklish. When a bear is hit, he gives a roar and tries to run away as quick as he can. We have been butchers the whole day. I have been trying the business of tanning, in order to get skin to mend the sleeping-sack with. The skin of the forelegs seems to be the most suitable, being the lightest. With fairly clear air today we have not seen land in any direction."

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[1] About 3 miles.—*Trans.*

In the evening, Andrée shoots an ivory gull, too, and notes that this kind of bird has three cries: 1) piyrrrr, with a soft "r" and a trill; 2) pyöt-pyöt; and 3) one resembling the croaking of a crow.

Dinner, at 3 a.m. on August 14, was a banquet: fresh bear's-meat, heart, brain (3.3 lbs.), short ribs of bear, bear soup with bear's-meat in it, bread, and wheat-meal biscuits. "At 6.30 a.m. we went to our berths after having washed our hands and eaten ourselves 'chock-full'!"

When the three men rose, about 4 p.m. they enjoyed a hearty breakfast of mixed fried meat: bear's-meat, ribs, heart, brain, and kidneys; ivory gull; bread; coffee; and wheat-meal biscuits. They lay still the whole day in consequence of rain and wind from the south-east. Andrée is now busy making the waterproof he had planned; the sleeping-sack, coats, and spectacles are mended, and the knives are sharpened. One or two ivory gulls settle near the remains of the bears, outside the tent. Both Strindberg and Andrée suffer an attack of diarrhœa, and the former is "bandaged all over with cotton-wool and bindings for a cut in the hand and a boil on the upper lip," after the sores are washed with a solution of sublimate. At about midday, they go to their berths again, but, from Strindberg's notes, they seem to have risen again at 6 p.m. in order to eat a little more. They eat quantities of bear's-meat and bear soup, with boiled meat, and then take a little bread and biscuits. With this meal, Strindberg ends his *"repas pendant le voyage"*—meals during the journey—and merely writes that "these meat dishes varied during the remainder of the journey."

On the next day, August 16, the start took place amid wind and snow. They take out their leather jackets and their *baschliks*[1], but hardly need them. The country grew difficult, but the going was good. Andrée believes that practically all the ice is of pressure origin. In his opinion, the whole of the hilly country undoubtedly consists of old hummocks, although even on the level floes one can notice oblique stratifications, pointing to the fact that the floe contains pieces of ice lying on edge. "I have seen the same thing today in various places in the old yellow floes."

In the morning of August 17, the weather cleared up for a while, but still no land could be discovered. Simultaneously, Strindberg appears to have taken a place-determination in consequence of which they decided to alter their course the next day to S. 60° W.

As may be deduced from what has been said above, the course of the expedition, as far as it can be determined, is directed more and more towards the west. The reason for this is that the current carries them more quickly southwards than they can manage to march towards the south-west, the result being that, since August 11, the party has drifted some 12 miles directly south-east.

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[1] Warm outer caps, worn above the one nearest the head.—*Trans.*

The march that day was terrific, the results of their efforts being that "we have not advanced a thousand yards, but, with the greatest difficulty, have dodged on from floe to floe. The ice here is fearfully pressed together, and shattered into small floes.—We ferried five times before midday, i.e., in 4¾ hours, and had to begin again as soon as we had eaten. We must be near the sea, the ice being so divided. The horizon almost perfectly clear towards Gillis Land, but we did not see any land in that direction. I believed that unpressed ice is found only near the egress of the Polar Stream into the open sea, [and is] formed by the freezing of the sludgy water." In the water between the floes there were many seals, a skua, and an auk.

Three ferryings and a rafting had to be undertaken after dinner. Their difficulties in doing this were increased by the constant formation of new ice, and by the floes being in perpetual movement. They pitched their camp late in the evening, having made, as Andrée says, scarcely a thousand yards.

"While we were sitting inside the tent, and Strindberg and Frænkel were getting supper ready and I was mending my pants, I heard a noise outside the tent, and when I looked through a crack in the opening, I saw a bear close to my nose. I did not leave off sewing, but merely said: 'Look, there's another bear for us,' whereupon Frænkel took hold of one of the guns (which by chance had been taken into the tent for cleaning), and crept out. The bear then stood a few steps from him and . . . in order to attack, but was met by a bullet that brought him down, dead, after he had gone a few paces. We continued our work and our supper before we even looked at the carcass, but afterwards, when we inspected the animal, we found it was a large he-bear, undoubtedly the finest of all we had shot. We took out the brain, kidneys, tongue, and some pieces along the back, altogether about 22 pounds, in order to supplement our supply of fresh meat. Strindberg took the lunar distance to check the chronometers and determine our position. He also set out some tackle for night fishing, baited with meat (bear)." The wind is now easterly, and they are happy, for they hope they will be able to drift in the proper direction. The horizon has been fairly clear, but they have seen nothing of Gillis Land.

On August 19, at about 7 p.m., Frænkel takes his usual "morning" observation. The sky is covered with clouds, the wind is north-easterly and has a velocity of 112 feet per second; the temperature is 30.6° F.

For breakfast, Strindberg has tried frying with bear-fat, which makes Frænkel say: "What a treat if we can make sandwiches." After a few hours more, they make a start, and march all night and a part of August 20. It is not stated when they pitch camp, but Andrée gives the following summary of the day's march:

"We have done a good day's work, probably 3 miles. Leads large but regular and with large [strips] between. The terrain exceedingly tiring, the new snow preventing us from seeing the irregularities, which constantly give the sledges unexpected jerks. The fresh-water pools, not yet frozen, compel us to detour a lot. I am quite worn out by the day's work. The reconnoitrings are carried out by me, and are very troublesome. I often have to go a long way among hummocks and over pools and along the leads. The worst are the fresh-water pools which turn in innumerable windings, real labyrinths, and which are united by means of wide fissures that do not become visible before one is close to them. I almost always throw my gun over my shoulder when I go off reconnoitring, and Strindberg and Frænkel sit waiting and shivering. Sometimes they reconnoitre in one direction, and I in the other. The reconnoitring for a route in the uneven country is almost as trying.

"We have encountered an immense lead, running N. 20° E. exciting wild crossings must often be made. The sledges capsize, or remain hanging over an abyss, while the puller tumbles down. Then comes the order 'Lie still!' and there he lies, a long while, holding up the sledge, until the others can come to help him. The sledges must often be pulled at great speed at one part of the crossing, and slowly during another part. They must often be swung round on a point, or in the middle of a pass. The axe and the spade must often be used to make a road. Tracks for one or both of the runners must be hewn. Perhaps the sledges have to be unloaded entirely, or else they are balanced across the boat. A line at each end of the boat makes it possible to pull it forwards or backwards. The quays break just when the weight of the sledge rests on them. The sledge, with its valuable cargo, is in a position of the greatest danger."

At 10 a.m. on August 21, the temperature has fallen to 25.7° F., and the faint wind is north-north-westerly. The expedition stands ready to start just after twelve. Andrée calls it a glorious day, and the air is light.

"Faint north wind, but the half-frozen leads and pools of water have caused us an immense loss of time. A single ferrying took two hours. I believe that we have not hitherto had such a large tract of ice so hummocky and so broken. Sample No. 10 was attached, frozen fast and half-dry (grey) to the fracture surface of a piece of ice pressed up by a lead. This evening, at my suggestion, we tasted what raw meat was like. Raw bear, with salt, tastes like oysters, and we hardly wanted to fry it. Raw brain, too, is very good, and the bear's-meat was easily eaten raw. Just as we were pitching our tent, three bears came to attack us. We took up a position near hummock. Strindberg shot the old one with one bullet. Frænkel shot the other with two. I fired four shots at the other cub and made hits with all, but his wounds were not so serious but that he could manage to get away among the fissures and pools. We took the best bits, i.e., 2/3 of the tongue, the kidneys, and the brains. We also took the blood, and Frænkel was instructed to make blood-pancake (my suggestion). He did this by using oatmeal and frying in butter, after which it was eaten with butter and found to be quite excellent. Of the bear cubs, one was rather big, the other (a female) was smaller. All the cubs we have seen have been young ones from the previous year."

For their supper, Strindberg hit on the plan of making soup of the algæ found along the edges of the ice. Experiments with this new dish, as well as with a cake made of Mellin's food, water, and yeast, gave excellent results, and as to the sea-vegetable soup, Andrée thinks it "should be considered as a fairly important discovery for travellers in these tracts."

On August 22, the start takes place about five o'clock. Andrée shoots a young ivory gull—full-grown—weighing about one pound. In his diary he gives a full account of its appearance and of its cry. "It seems to be the young ones that give the cry 'pyöt-pyöt,' which was noted down on August 14 as that of the ivory gulls. When the mother is anxious, or gives a warning, she makes the cry 'piyrrrr,' but then with a sharp '*r*' and in close succession. . . .

"The terrain today has been terrible, and I repeat what I wrote yesterday, that we have not previously had such a large tract with ice so hummocky. Scarcely two square yards of ice can be found which does not present evident traces of pressure, the entire country consisting of a boundless field of large and small hummocks. One cannot speak of any regularity among them. The leads today have been broken to pieces and the floes small, but, in general, it has been easy to get across. Now they are so frozen that neither ferrying nor rafting can be employed. Today, a lead changed just when we had crossed it (five minutes later, and it would have been impossible) and we had an opportunity of seeing a very powerful pressing. The floes came at a great speed, and there was a creaking round about us. It made a strange and magnificent impression. The day has been extremely beautiful, perhaps the most beautiful we have had. With a specially clear horizon, we have again tried to catch sight of Gillis Land, but it is impossible to get a glimpse of any part of it. Our course has been S. 60° W., as on the previous days, and the day's march has probably brought us about 3 minutes[1] in the direction of our course. The clear air was utilized by Strindberg to take lunar distances. He saw haloes on the snow; an inner one, more sharply defined, with the inner boundary red . . . where the colours, however, could not be determined quite absolutely. Observed from the ground, these haloes seemed to be the extremities of parabolas or of ellipses. Magnificent Venetian landscape with canals between lofty hummock edges on both sides, water-square with ice-fountain and stairs down to the canals. Divine."

During the march, Frænkel pulled so hard that his knee went out of joint but it came in again at once and "there was no harm done," as Andrée expresses it. Strindberg had a pain in one toe from some unknown cause. One comfort in all the troubles is that bear-ham several days old is splendid.

On August 23 the expedition does not rise until about ten o'clock and it starts one hour later. They made alga soup, with large portions of algæ, together with fried bear's-meat and a couple of spoonfuls of Mellin's food, which formed a soup that Andrée thought was excellent but that Frænkel and Strindberg did not like so much, although they considered it could be used as emergency soup.

The difficult ice area continues until four o'clock when they find smoother going. "A lead opened just when we were about to cross and we had once more to employ ferrying. Two bear-tracks were crossed. Frænkel considers that the fresh-water pools often or sometimes penetrate the entire thickness of the ice. Strindberg called our attention to the fact that the lateral fissures are sometimes connected with these fresh-water pools in such a way that we may suppose that the fresh water of the pools weakens the ice to breaking-point when the pressing occurs." A number of samples of clay with traces of plants are taken and examined carefully. Frænkel also finds a piece of rotten driftwood sunk into the snow and a piece of this, too, is kept. Additional samples contain algæ such as Strindberg uses for the soup and the eyes of the ivory gull shot the previous day are preserved "to permit us to examine their construction against snow-blindness. It is not easy to preserve all these samples from damp and accidents," writes Andrée. An improvement in the situation has occurred, however, as the ice on the lakes of fresh water now begins to bear here and there; this is a good thing, for the men are in despair at the roundabout ways they are compelled to take on their account. The day's march was probably about 4–4½ miles and they are all terribly tired. The rich supply of meat has allowed an increase of the rations to 6 or 6½ pounds per day for the whole party, while the bread-ration has been diminished to 3 ounces hardtack and 6 ounces biscuits per day—and "we thrive very well on the diet," says Andrée.

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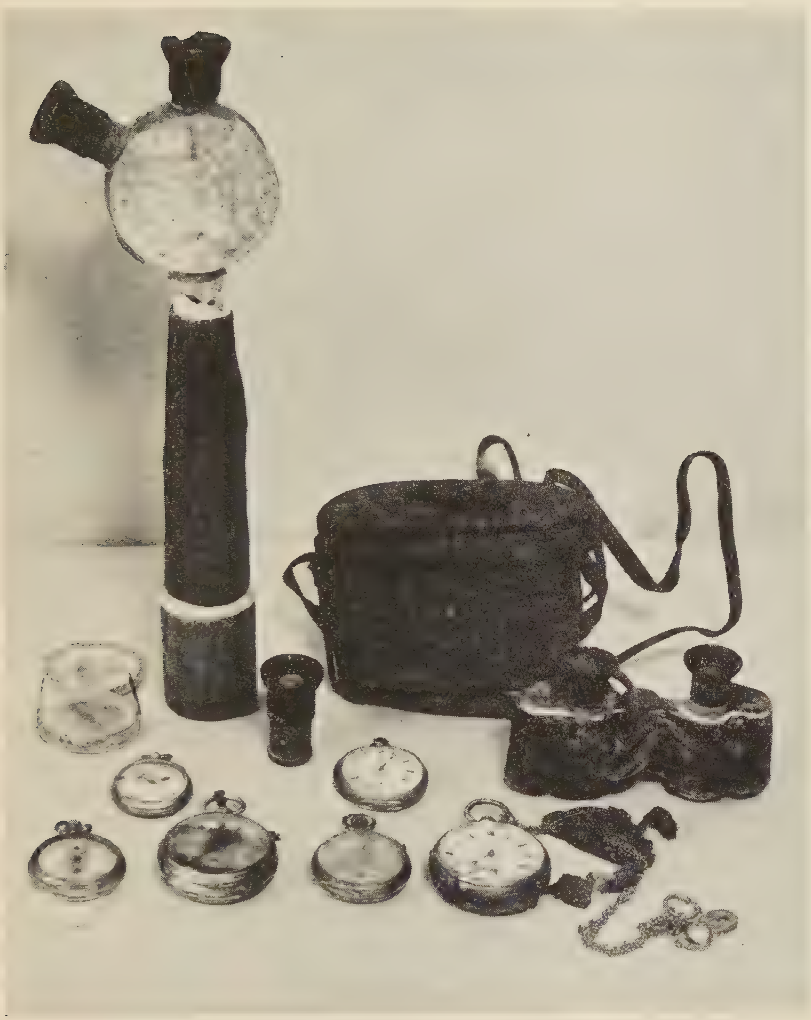
[1] About 3½ miles.—*Trans.*

At midday on August 24, "the ice conditions are still dreadful. We are now in a difficult hummocky district miles in breadth. I caught a hasty glimpse of a fish. It was about 4 inches long, dark-grey on the back and provided with a couple of small wide transverse stripes (far apart) across the back. Like the other one it was found in a lead connected with a salt-water pool and it was immediately below the surface (about 8 inches). It moved slowly like the other one but glided in beneath the bits of ice."

During the course of the day some further samples were taken of the clay with traces of plants, which come from the coasts of Siberia and the shallow sea nearby. Andrée devotes touching attention to sample 17 especially. "It was washed in a tea-strainer, whereby, perhaps, some small quantity (clay?) was sluiced away but otherwise everything was included. The leaves were dried by being placed in layers in a 'bandage' and dried against the breast." After having made this find Andrée notices that "the ice is perforated everywhere and filled with things that are certainly well deserving of a special polar expedition on their own account. But then one should be provided with appliances, to enable one easily to enlarge the holes and take up the objects. The naturalist would find the interior of the ice to be almost as rich in contents as the earth-crust or the sea." Some additional samples are taken and the men devote a watchful interest to everything that comes their way. "We have several times seen a black little bird with white on the wings like a black guillemot, but black under the belly like a great auk. It has a kind of twitter and we have not seen it fly but only dive. What kind of bird is it? Fulmars and ivory gulls sail around us pretty often."

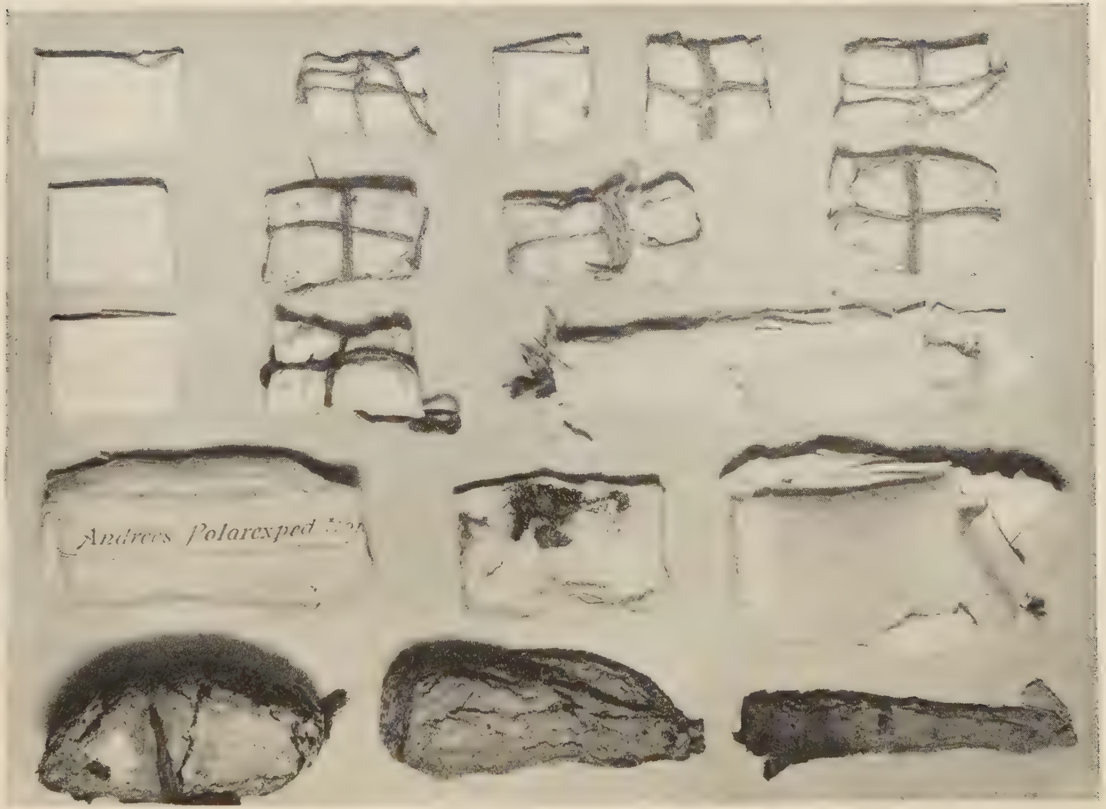
For supper the bear's-meat is fried without butter and they find it excellent. The provisions are rationed very strictly. Butter is eaten only at dinner. The quantity of meat per day is 2.9 pounds per person at breakfast and supper, and .9 lbs. for dinner. The amount of bread is 2.5 ounces per day per person and of biscuits 5 ounces. Luckily "bear-tracks were seen today, and the day before yesterday two such traces were observed. This means for us that we have wandering butcher's shops around us." The condition of the party, however, is far from good. In all their brevity, the following lines, entered between the scientific notes and the grim jest of the wandering butcher's shop, gives us an idea of the three men's sufferings and labours. "Last night Frænkel had severe diarrhœa, but this probably was the result of catching cold. He suffers sometimes from cramp, perhaps on account of over-exertion. Strindberg's tender foot has been cured by rubbing boot-grease on the stocking. Cramp relieved immediately by massage treatment."

That day they pitched their camp towards the early part of the night, for Frænkel has entered in his journal a meteorological observation for 1 a.m. on August 25. But some hours' labour still remained for the three men before they could seek rest, for in the notes for August 27 there occur a couple of detailed



THE EXPEDITION'S FIELD-GLASSES, COMPASS, PEDOMETER, AND WATCHES

Right, the chronometer Kullberg 5567 with Andrée's watch-chain and charms. Second from left, Kullberg 5566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SCIENTIFIC SPECIMENS COLLECTED BY ANDRÉE DURING THE SLEDGE JOURNEY stock-taking lists, dated August 25, 2 a.m., and showing the loads on Andrée's and Strindberg's sledges.

Frænkel's next observations are dated August 25, 8 p.m. The south-easterly wind has grown calmer and the temperature is 31.6° F. At 9.45 p.m. the expedition starts.

The ice today is much better, and the going excellent. "Many leads, but they have been easily crossed and between them the floes have been large and fairly level. . . . A bird was seen, most likely a skua. He was quite black except underneath, where he was blackish-brown. Flew as silently as a spirit and dived down here and there for food. I shot one of those mystical great auks. He looked like an ordinary auk, but was white all the way up the side in front of the wing so that, at a distance, he looked like a black guillemot and, in addition, the tips of the feathers were white on the inner half of the wing. Three-toed without spur, the beak quite black. The sea-serpent was seen, but looked different. He still appeared to have two buckles but now he seemed to be grey all over, and when he dived a twice-cloven fin was seen at the end."

Andrée also comes to a surmise as to the origin of the stratified layers of the ice which he has so often observed and wondered at. He illustrates his opinion by means of sketch and text. He notes that, on melting, the projecting tops and edges of the ice are covered with clay as much as an inch in thickness.

On August 26, the camp is pitched about midday. To the sample (No. 19) taken previously, of a piece of turf from a hole in the ice, there is added another sample (No. 20), of a large find, embracing clay, leaves, bits of driftwood and shells. Andrée summarizes the events of the day as follows: "Frænkel fell into the water today and has diarrhœa, and Strindberg has a pain in his foot, and I have diarrhœa; but we covered a good distance today in any case. This evening, I have made fish-hooks of pins and have fished with meat and fat. We shall see if I get anything tonight," he ends.

The men are awake again early, at 1 a.m. on August 27. Andrée examines his fishing-lines, but the six hooks, which were at a distance of 19 inches from each other and about 16 feet below the surface, were all untouched. The thickness of the ice at this place was from 4 to 5 feet. Where there had been pressure, the thickness rises to nearly 9 feet.

At 2.30 a.m. they break camp; the sledges are in order and the expedition starts. The weather clears and becomes magnificent. "During the whole of the forenoon, we had good going and good floes, although the leads were numerous. But in the evening the difficult country began again. It consisted of small and, in part, antheap-like hillocks standing very close together, between which the sledges repeatedly capsized and caught fast. However we certainly made 4–4½ miles today and had one of our best days. . . . Today we have seen ivory gulls and a bird which was probably an auk. This evening, too, I have put out the long line for fishing. Frænkel has again had very bad diarrhœa and has been given opium. I have had diarrhœa, too, today but I imagine I am well again now without any medicine. Strindberg is greatly occupied calculating lunar distances." Of the other events of that day Andrée notes that he has mended Strindberg's photographic apparatus and the spirit-tin, and that he has had much trouble with the large sample (No. 17). He still devotes his liveliest interest to the question of the stratified ice—which he discovers is only an illusion, for it "arises from the periodic melting and freezing of the water at the edges of ice which already exists."

A little change in the food arrangements are made the same day. As they have begun to use Mellin's food in the coffee and chocolate, they consider they can still further diminish the bread-rations, and the only vegetable food they have eaten that day has been 4 cakes of Schumacher hardtack and 6 Albert biscuits.

August 28. It is cold. At 9 a.m. Frænkel notes 22.1° F. and a fresh north-north-easterly wind. The fishing-line has been out in the water all night but, as before, without result.

About midday they come to terrible ice, large hummocks with deep, perpendicular-sided pools between. In the evening the ice is "typical polar floe-ice. Scarcely a square yard that is not hummocky and the entire surface is covered by old, low hummocks and pieces of ice which, by melting, filling up with snow, and freezing, and by the grinding of the snow, have been rounded off into innumerable small hillocks varying very much in form and size, and between which there are frozen pools of water, with ice which is still level but which, by its bulging, etc., shows that it, too, will soon join the billowy part of the surface." The study of this ice "leads the thoughts irresistibly to the geological phenomena in the crust of the earth, whose late sedimentary strata correspond to the pools of water."

In the evening the temperature has fallen and the wind is still fresh. Andrée says, however, that they have not suffered from it. "The tent and sleeping-sack begin to be difficult to manage. Frænkel is bad again. Yesterday he had an opium tablet [1] against diarrhœa, and this evening he has had a morphine tablet against the pains in his stomach. We shall see if he can be made a sound man again."

The course has still been kept at S. 60° W., and as the wind has been north-west Andrée and his comrades hope that they have drifted towards the south. As a matter of fact, since August 11 they have drifted in a wide arc towards the east-south-east, so that they are now no more than 12 miles south from the point on which they stood 6 days before. All their efforts have practically been in vain.

The next day it begins to feel cold. The expedition starts at 3.30 p.m. and tries to keep a course towards S. 45° W.

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[1] The find made on White Island includes the medicine-chest of the expedition that remained with the party after the other chest had been thrown from the Eagle. In the chest there were several medicinal preparations in small tablets.—*Ed.*

But it is no easy matter to keep a fairly steady course over the hummocks between the frequent leads. The ice and snow, too, have become as hard as glass, so that it is difficult to draw the sledges over them. Strindberg's sledge is badly broken and they are just able to mend it. "We come slowly onwards and I imagine we shall have to make a late autumn journey to reach Mossel Bay" is the only remark Andrée writes in the presence of this gloomy perspective. A bear appeared but "unfortunately he went off at a gallop when he saw that he was noticed."

"Tonight was the first time I have thought of all the lovely things at home. Strindberg and Frænkel, on the contrary, have often talked about it. The tent is now always covered with ice inside, and the bottom, which is double, feels pretty hard when it has been rolled us. I sweep it clean morning and evening, before and after the cooking."

August 30. It has become still colder. At the start, about 4 p.m., it is 20° F. and the wind is fresh. The ice is the same, and the course difficult to keep, the leads being troublesome to cross.

"At last we found ourselves on a floe from which we could not advance without rafting. As we had not more than 20 minutes left of our marching time we determined to pitch our tent and see if the ice might not move during the night. Scarcely had we erected the tent before Strindberg cried out: 'A bear right on top of us.' A bear was standing ten paces from him. I was lying inside the tent sweeping the floor and so could do nothing, but Frænkel, who was outside, caught hold of a gun and gave the bear a shot that made him turn, badly wounded. To save cartridges he was allowed to run a bit, but at last he had to be finished off with three more shots. The bear, however, had managed to get down into a broad lead and rolled himself about there, but he could not swim far. I threw a grapnel past him and brought him in to the edge of the ice. This, however, was so thin that we hardly dared to stand on it, but at last I succeeded in putting a noose around his neck and one around a foreleg.

Strindberg pried with the boathook and so we hauled him up on to the ice pretty easily. The scene was photographed and the bear was cut up. Once again we have 66 pounds of meat, i.e. meat for 14 days if we calculate two pounds each for morning and evening, and 11 ounces for dinner. These quantities are carried next to the body, so as not to be frozen. Two red-breasts[1] visible."

They pitched camp early in the night. It was a little less cold now, being 25° F.

When they awakened in the afternoon of August 31, it was still 25° F., but the north-west wind had increased in strength. They set out in the evening. "The sun touched the horizon at midnight. The landscape on fire. The snow a sea of flame." The polar summer is definitely ended, and hereafter the days will rapidly decrease in length and the dark nights lengthen as rapidly.

The country is, however, fairly good. "For the first time we had broad, new ice to cross. First I crept across on all fours to test if it would hold. Then we went across in several places." Ferryings have to be undertaken over the broad leads, however, and the difficulties increase as the ice is in lively motion. "It is stirring to work the sledges onward in the midst of crashing ice all about us. Sometimes a lead closes just when we need it, sometimes it opens suddenly the moment before or after a crossing. I had diarrhœa badly, perhaps in consequence of a chill. Frænkel's sledge badly broken and had to be repaired on the spot. In the evening I took both morphine and opium.

"When we awakened on September 1 we felt we wanted rest and repairs. The sleeping-sack, etc., had to be mended, and we needed to be out of harness for a day. Everyone sewed and we chatted, ate, and drank. We were in the best of humours, especially when Strindberg announced that we were in 81° 16′ N. lat. and that hence we must have been driven rapidly southwards by the prevailing strong north-west wind. We even had sandwiches and coffee with our bear's-meat dish at dinner. In the evening we took soundings.

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[1] Ross's gulls.—*Ed.*

"We shall now try to keep day and night schedules. We have found that the last bear's-meat, which had not been allowed to get wet in any way except for our pulling the bear through the water, was juicier than usual, and so, in the future, we shall treat all the bear's-meat in that way. I have now begun to use wool-and-hair stockings at night, and tonight for the first time I shall crawl into the sleeping-sack top." During the night Andrée had to leave the tent on account of diarrhœa and "then found a bear standing a little way off staring with open mouth at the camp. He seemed, however, to have found the matter suspicious for he jogged away and so cheated us both of brains and kidneys, to say nothing of kidney-fat and blood-pancake."

September 3. At ten o'clock the temperature has risen somewhat so that it is only 27.7° F., but the south-easterly wind continues. The ice-floes were fairly level, although covered with fresh snow, which made the work of pulling the sledges very heavy. Later in the day, however, an important change occurred: the expedition found itself surrounded by broad leads of great extent, and it was compelled to trust itself entirely to the boat.

"We succeeded in loading everything upon it, and then rowed for three hours at a pretty good pace towards the Seven Islands (our goal). It was with a rather solemn feeling when at 1.50 [one o'clock] p.m. we began this new way of travelling, gliding slowly over the mirror-like surface of the water, between large ice-floes loaded with giant hummocks. Only the shriek of ivory gulls and the splashing of the seals when they dived and the sharp commands of the steersman broke the silence. We knew that we were moving onwards more quickly than usual, and, at every turn of the leads, we asked ourselves in silence if we might not be able to journey on in this marvellous way to the end. We called it marvellous, for the everlasting pulling of the sledges had become tiring, I fancy, the last few days, and it would be a great relief for us to travel awhile in another fashion. But at five o'clock our joy came to an end; we then entered a bay in the ice which immediately afterwards was closed by a floe, so that we could go neither forward nor backward. We were satisfied, however, for things had gone well; the boat was excellent, and there was room for all our luggage."

"September 4, Strindberg's birthday. Festal day. I awakened him, giving him letters from his sweetheart and relations. It was a real pleasure to see how glad he was. Today we have had some extra food in honour of the occasion. The breakfast consists of bear's-meat with bread and Stauffer's pea-soup with bear's-meat and bear's-fat. At dinner, fried bear's-meat, kept warm inside our waistcoats. Supper, bear's-meat, bread and pâté de foie gras, Stauffer-cake with syrup sauce, syrup and water, speech for Nils, Lactoserin chocolate. Strindberg celebrated his birthday by falling very thoroughly, sledge and all, into the 'soup.' We had to pitch our tent after three hours' march, and then had a very troublesome and time-wasting business to dry him and his things. Much of the bread and biscuits and all the sugar damaged, but we had to keep it in any case, and this was done by drying a part of the bread slowly and using it as before. The remainder was fried along with the bear's-meat and the sauce. The sugar is poured into the chocolate and coffee in its liquid form. The biscuit-mud is mixed with cold water, and then boiled together with the chocolate. It was a pretty grave misfortune, but the worst of it is that it makes life more uncomfortable for us. . . . The accident to Strindberg's sledge did not lessen our festal mood, but we were jolly and friendly as usual. The altazimuth became wet through with salt water, but was washed out with fresh water and dried, and did not seem to have suffered any damage. Strindberg's chronometer also seems to have escaped. Ivory gulls swarm around us and keep up an awful row." On the same day Andrée also writes: "On such a journey as this one develops a sense both of the great and of the little. The great nature, and the little food, and other details."

On September 5 the three men started in the evening, in spite of their resolution to keep day and night schedules.

"Animal life seems to be becoming richer. A bear had been close to us during the night. Twelve ivory gulls sat beside the tent on a piece of ice. Frænkel shot three of them with a single shot. An auk and two black guillemots visible. Half a dozen seals in the same 'soup,' etc. After four hours' extremely fatiguing march, we came to a broad channel which we could not pass, and so I determined to launch the boat, and try to move on by rowing. This was a fortunate determination, for we came more and more upon broken ice, and we kept on rowing until 6.45 a.m. on the sixth. It was very refreshing to be able to use this mode of travelling. The intervals between the floes were several miles wide, and only in part covered with ice-sludge, which was a good thing, for ice-sludge is a very tough mixture to row along in. We had no wind to struggle against, and rowed on without the slightest pause until, at the time mentioned, we went ashore on an ice-floe to pitch our tent. Respecting the ice of the a.m. it is to be noted that I measured one floe with a thickness of nearly 20 feet below the water (about 19 inches above the water) and that in the fracture of this block one could see that although it was apparently homogeneous, in reality it was composed of pressed thin floes that had frozen together."

Andrée continues to describe his observations of the ice and his opinion regarding its formation, and notes that the ice-floe on which they encamp after the boat journey had a length of about 330 feet and a breadth of 250 feet, and that, round about, it had a border of a projecting edge, which extended 2 inches below the surface of the water.

When they awakened on September 6, in the afternoon, after a long and invigorating sleep, the leads around the camp had frozen together. When, after much trouble, they had crossed to the next floe the country was reconnoitred and they found that they might possibly advance in another direction than the one they had taken. So they turned back and then met a walrus, "whose noise and behaviour in other ways and whose habitat showed us that we had met the 'sea-serpent.' Consequently they were walruses we had heard and seen all the way up at the place where we landed from the balloon. After a short row, we came into much thicker snow-sludge, which finally became almost a yard deep, and in which the boat absolutely could not be forced forward. The situation became critical, but one of us succeeded in jumping 'ashore' and pulling the boat to a point where we could stop and pitch our tent. This sludge is something fearful. It occurs when cakes of thin, newly formed ice are pushed on top of each other, layer after layer, like tiles, or like cards in a pack."

The next day, September 7, "we tried again and, after about 5 hours' work, we advanced about a thousand yards on our course, but then we had to wait again. Meanwhile we busied ourselves making a sail out of the bottom tarpaulin of the boat, a rudder of the shovel and the table. Our meat supply is beginning to come to an end, and we shot two ivory gulls to supplement it. We do not like to shoot unless we can get at least two gulls per shot. They are delicate birds but I think they cost a lot of ammunition. For the last few days Frænkel has had a pain in his left foot. I give him massage morning and evening and rub on liniment. Today I opened a large pus-blister, washed it with sublimate solution and put on a bandage. Now I hope it will heal, for it is hard for us to be without Frænkel's full strength. This is more than needed with our trying work. Our attacks of diarrhœa seem to have stopped."

After the long notes quoted above, Andrée has entered a couple of incomplete notes, which are very difficult to decipher, respecting the position of the expedition, and in this connexion mentions that "we are probably more to the north than before, for we have had several days' wind, from directions lying in the neighbourhood of south-east."

This drift-path, which has been calculated on the basis of the observations Strindberg entered in his logbook, shows that, from midday on September 6, during September 8, and until the afternoon of September 9 the expedition, in spite of its endeavours to move south-westward, had been carried some 18 miles by the ice-drift in a direction which was exactly opposite, i.e., towards the north-east.

Immediately after the place-determination in question, Andrée continues, "just now I had to leave off writing, in order to fire a shot and drop two ivory gulls. Such birds always gather round our camp. Oh, if we could shoot a seal or a bear just now. We need it so much."

In the evening of September 9 the three men are ready again to attempt a march.

"Frænkel's foot is now so bad that he cannot pull his sledge but can only help by pushing. Strindberg and I take turns to go back and fetch Frænkel's sledge. This taxes our strength. We could not manage more than 6 hours' march, especially as the country was extremely difficult. Just when we stopped, I happened to fall into the water, for an ice-floe which to all appearance, and on being tested with the boat-hook, seemed to be solid, and on to which I jumped, proved to consist of nothing but a hard mass of ice-sludge which went to pieces when I landed on it. I flung myself on my back and floated there, until the others reached me a couple of oars, with the help of which I crawled up again. Hitherto I had no idea that ice-sludge could take on such varying forms. It most frequently consists of thin cakes pushed up on top of each other, and these, naturally, possess a certain ability to float and to cohere, but little carrying-power."

As a result of this event Andrée gives his opinion as to the method of formation of the thin ice and of its importance for polar ice in general. Then he adds: "Large seals are swimming about in the water here, but we cannot shoot well enough to kill them on the spot, and if this is not done, they sink."

Then there are no more notes in Andrée's diary before September 17.

The march across the ice has become more and more difficult every day for the three comrades. Illness has attacked all three of them. Even if Andrée says little about it, it is clear that Frænkel is much exhausted by his diarrhœa and his bad foot, and that his power of resistance is greatly diminished. Although Strindberg, too, has had a bad foot, he and Andrée have assisted their sick comrade to pull his sledge in their despairing efforts to reach the Seven Islands. When the drift of the ice made them determine to alter their former course from Franz Joseph Land towards the Seven Islands, it was done in the hope that the current would help them onwards. They were tired, but their strength was as yet unbroken. Since then, the forcing of the hummocky ice, the crossing of leads and pools of water, the cold, the forced rationing of food, and the approach of the polar autumn had greatly tried their strength. The worst was, however, that the ice-drift had not helped them on towards their goal. From August 4 to September 9, in spite of their almost superhuman efforts, they have been carried about 81 miles towards the south-south-east, instead of an estimated equally long distance towards the south-west. The formidable nature of the pack-ice has proved too much for their powers. Without one word of complaint, without a hint of uneasiness or of lost hope of rescue, Andrée leads his brave companions onwards, at the same time making his scientific observations and drawing deductions as to the ice and the other natural phenomena around him. The three men still retain their good humour, but it has now turned a little hard and grim.

For the last few days before September 9, Andrée has not kept his diary as regularly as before, and now he stops entirely. Strindberg became silent long ago; he merely continues to enter a few scattered marginal remarks in his almanac. He has quite enough to do, too, in taking astronomical observations and calculating the results. And each time he finds the result it is only a fresh disappointment, for time after time their hopes of having advanced towards the south-west are shattered. Frænkel alone continues with one or two meteorological observations daily.

Thus ends in Andrée's diary the second phase of the pilgrimage towards land across the ice from the spot where the Eagle descended.

IX

Caught in the Ice

"Since I last wrote in my diary, much has changed, in truth." These are Andrée's first words on September 17, and he continues: "We laboured onwards with the sledges in the ordinary way, but found at last that the character of the new-fallen snow did not allow us to make fast enough progress. Frænkel's foot, which still did not allow him to pull, compelled me and Strindberg to go back in turns and pull Frænkel's sledge too. One of Strindberg's feet was also a little out of order. Our meat was almost at an end, and the crossings between the floes became more and more difficult on account of the ice-sludge. But, above all, we found that the current and the wind irresistibly carried us down into the jaws between North-East Land and Franz Joseph Land and that we had not the least prospect of reaching North-East Land. It was during September 12 and 13, when we were obliged to lie still on account of violent north-west wind, that we at last discovered the necessity of submitting to the inevitable, i.e., wintering on the ice. Our position is not specially good."

From the account already given it is clear that the drift of the ice has overpowered the three men. In spite of all their efforts, they have been unable to make their way onwards in the direction they wished. For two long months they have struggled on amid the ice, first towards their large depôt on Franz Joseph Land, and then towards the smaller one on the Seven Islands. In neither effort have they been successful. Now they stand worn out and ill, with insufficient supplies of food, with broken sledges and worn-out clothes, face to face with the necessity of surrendering themselves to the mercies of the pack-ice at the beginning of the polar winter. They are caught in the ice and delivered into the power of a drift which is governed by wind and wave. But they do not relax their efforts in this extremely critical situation. They endeavour, by every means in their power, to take such steps as will enable them to keep alive. They have no idea whither the ice will carry them during the coming months. The only thing they know is that they are drifting down towards the sea between North-East Land and Franz Joseph Land.

After September 9 Andrée ceased for a week to make any notes. On September 10–12 the three men must have continued their efforts to penetrate towards the south-west. On these days a fresh north-easterly wind was blowing, which possibly gave them the hope that the current would carry them in the right direction. But strangely enough, according to the place-determinations, they were carried towards the north-north-west instead. In the evening of the eleventh, however, the wind swings round to a hard north-west and the temperature falls to 17.6° F. On September 12 and 13, the velocity of the wind increases to 33–46.2 feet per second, and the temperature is still low. The expedition must have lain still these last two days on account of the storm. In Strindberg's memorandum-almanac there is a note for September 13–15: "Stopping on account of bad weather and snow." When the decision to remain on the pack-ice was reached, the three men first of all sought a suitable place to winter, for they were then on a small and low-lying floe full of fresh-water pools, which showed that it was composed of small fragments which would easily fall to pieces when spring came. Their first step, therefore, was to make their way across to a neighbouring floe which was larger and stronger, and richer in hummocks than the other one. "We reached the new floe by rafting with the boat, and soon found a suitable building-plot consisting of a large piece of ice which we hollowed out to some extent. The sides and the parts that were missing we supplied by filling up with blocks of ice and snow, over which we threw water to make them solid and durable."

On September 15 the wind still blew hard from the north-north-west. The skies were quite covered with clouds. "We at last succeeded in getting a seal, as I had the luck to put a bullet right through its head, so that it was killed on the spot and could easily be brought 'ashore.' Thanks to this we had tolerably large rations for the next three weeks. We ate all the seal except the skin and the bones. I do not except the stomach and the contents of the stomach, and the intestines and the liver. But the contents of the stomach consisted of hardly anything except empty shells of the same animal that had stopped up the hydrogen-gas apparatus.[1] Every part of the seal tastes very nice (fried). We are especially fond of the meat and the blubber. If we can only shoot some score of seals so that we can save ourselves! The bears seem to have disappeared, and of other game we can see only ivory gulls, which, it is true, are not to be despised, but which cost too much ammunition. The gulls come and sit on the roof of the tent. Remarkably enough, the fulmars seem to have disappeared, and of other birds, only an auk or possibly a young black guillemot have been visible during the last few days. Frænkel's foot is better now, but will hardly be well before a couple of weeks. Strindberg's feet are also bad. I have rigged up a landing-net to catch plankton, or anything else that can be found in the water; we shall see how it succeeds; a lucky outcome of this attempt might somewhat improve our difficult position. Our humour is pretty good, although joking and smiling are not of ordinary occurrence. My young comrades hold out better than I had ventured to hope. The fact that during the last few days we have drifted towards the south at such a rate contributes decidedly, I think, to keeping up our courage."

The fact is that since the twelfth they have drifted not less than 45 miles south-south-eastwards, i.e., the average speed has been about 1.2 mile per hour. Hence, Andrée writes: "Possibly we may get far enough south, and quickly enough, to obtain our nourishment from the sea. Perhaps, too, it will not be so cold on the sea as on land. He who lives will see. Now it is time to work."

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[1] A small crustacean—the apparatus at Dane Island.

This day was notable for an all-important fact: "We have seen land for the first time since July 11. It is undoubtedly New Iceland that we have come in sight of."

New Iceland is White Island.

September 17. In the forenoon they took the bearings of the island, of which Andrée makes a drawing. The island is then at a distance estimated at 6 miles. "Large glacier blocks are visible in front of and along the glacier. The upper border [is] very even, and the arching of the island not broken by any peaks. Its appearance is shown by the appended drawing.[1] There is no question of our attempting to go on shore there, for the entire

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[1] See *Page 94* of Andrée's diary. Eleven months after Andrée had written these lines regarding White Island, a Swedish expedition under the leadership of A. G. Nathorst passed the island along almost the same path as that over which the three men drifted. Nathorst gives the following account of the island—of whose secret none then dreamed—which is in entire agreement with Andrée's:

"In the morning of August 18 there was visible forward a peculiar vaulted light, which seemed to resemble land, but we had been so often deceived that at first we did not know what to believe. In the forenoon, however, this patch of light seemed to be really like land and was then photographed by Hamberg; we thought it was Kjeldsen's White Island, at the base of which a glacier-foot is visible. Afterwards the weather became misty and now the glacier had the appearance of actual land far away, while the vault of light, then, would be the clouds above it. But when it cleared up still more between eleven and twelve, it turned out that our first opinion was correct, and wonderful was the picture that appeared before our eyes. We had in front of us a dazzlingly white island, rounded like a shield, consisting entirely of snow-covered glacier-ice, which on the shore terminated in a perpendicular glacier-foot. Not a single mountain-top lifted itself above the covering of ice; the ice was dazzlingly white from its summit to its foot; it was as though one had caught a glimpse of the Antarctic continent, although in miniature. A bank of mist lay the whole time over the island, the highest part of which was lost in the cloud, without allowing any definite distinction to be drawn between the two. Once or twice, the sun was seen to shine through the openings in the clouds above the white covering, and the small, dazzlingly white patches told us that the view of the whole island in clear weather must be indescribably magnificent. But I am afraid that this seldom occurs; and today the weather was wintry, with gusts of snow. We went up towards the island, following the east coast northwards. Here and there, immense fissures were visible in the ice which allowed us to surmise that the underlying rock was uneven. The glacier-foot was equally precipitous everywhere and no landing could be thought of."

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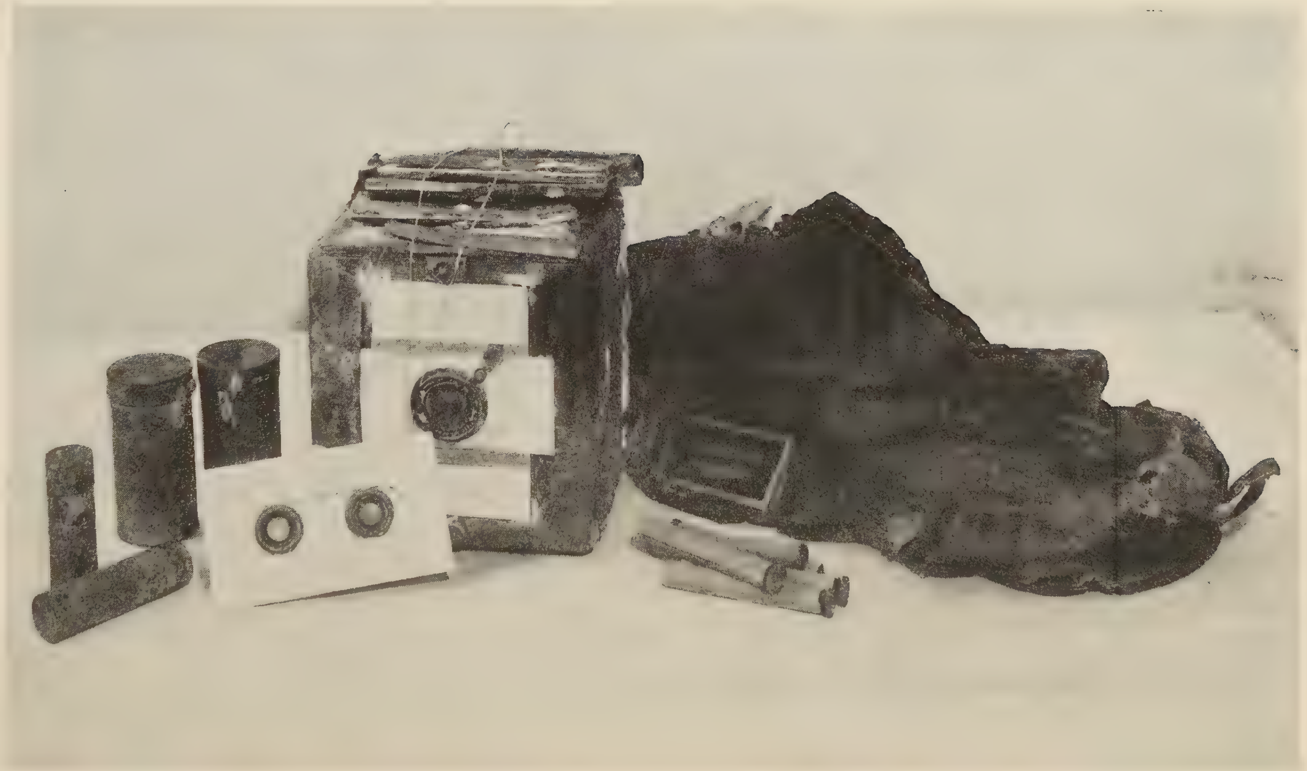
THE FLOE SPLITS APART

PACK-ICE



ONE OF THE CAMERAS WITH CHANGE-SACK AND FILMS island seems to be one single block of ice with glacier cliffs. But it appears to be not absolutely inaccessible on the east and west points. We saw a bear close to the shore, and in the water I saw a couple of flocks (of 4) of those 'black guillemot youngsters'. . . . Our arrival at New Iceland is remarkable, because it points to a colossal drift, viz., of more than one degree of latitude since September 12. If we drift in this way some weeks more, perhaps we may save ourselves on one of the islands east of Spitsbergen. It makes us feel anxious that we have no more game within shooting distance. Our provisions must be quickly and heavily supplemented if we are to have any prospect of being able to hold out for a time." They see nothing around them but a couple of auks, ivory gulls ten at a time, and seals; but the latter "were greatly afraid." No walrus appears, and the water seems deficient in small forms of animal-life, for dragging with the landing-net gave no result.

September 18. In Sweden on that day the twenty-fifth anniversary of King Oscar II's accession to the throne was celebrated.

"Jubilee day was a lucky day for us. The weather was beautiful and our work went on quickly. I had succeeded in shooting another seal, this time with small shot. He was not quite dead, but we got him anyway. Fearing that he would exhale all his breath at the last minute and go to the bottom, I gave him a new small-shot cartridge in the back at very close range. The small shots were afterwards found between the blubber and the flesh and consequently had not had any deadly—if even damaging—effect. Then I cut up the seal and found among other things that the bones of the skull are as thin as egg-shell, so that it should be possible to kill a seal easily with small shot in the head. Of the inner parts of the seal we have now tried and eaten the following: the brain, the intestines, liver, lungs, meat, blubber, kidneys, heart, stomach, contents of stomach, blood. We had the Swedish flag hoisted, and finished the day with a ceremonial meal." According to Strindberg's logbook the menu was:

BANQUET, SEPTEMBER 18, '97
ON AN ICE-FLOE IMMEDIATELY EAST OF . . . . .
Seal-steak and ivory gull fried in butter and seal-blubber, seal-liver, brain, and kidney
Butter and Schumacher-bread
Wine
Chocolate with Mellin's Food and Albert biscuits and butter
Gâteau aux raisins
Raspberry syrup sauce
Port wine 1834 Antonio de Ferrara, given by the King
Speech by Andrée for the King with royal cheer
National anthem in unison
Biscuits butter cheese
A glass of wine

Festive feeling. During the day the Union flag[1] floated above the camp.

"The general feeling was one of the greatest good cheer, and we lay down satisfied and contented. We had had New Iceland in sight all day to the westward, having drifted to its eastern side. The upper contour of the island was rounded like a loaf from that side too, and the shore consisted of the edge of a glacier. We were within one or two thousand yards of this edge." Strindberg measures the height of the island and takes the bearings of its southern and northern points, so that by taking new bearings the next day he can determine if they had drifted. It is now evening and 25.5° F., with a faint north-north-westerly wind.

"Sunday, September 19. Yesterday seems to have been the first link in a chain of Jubilee days, for today we have succeeded in increasing our supply of provisions so much that it will last until the end of February. I managed to shoot two seals (small-shot No. 00) and one great seal (bullet) today. I cannot describe how glad I felt and how pleased my comrades seemed to be, and how they looked forward to the future with hopes considerably strengthened. The greater part of the day we were busy cutting up, etc.; draining off the blood and storing it played a very large part, for we have found that Frænkel can make excellent blood-pancake of seal-blood (10½ ounces) and seal-fat (5¼ ounces) cut into small pieces, with one ounce flour with a pinch of salt and a pinch of yeast-powder. In addition we have discovered that the weight of this mixture is not notably diminished in frying, as is the case with meat, of which the weight when ready is about 1/3 less than the raw weight. Finally, the pancake does not produce the revulsion which Strindberg and I experienced for the first few days a couple of times when we ate seal-meat and blubber. To a certain extent the pancake seems to supply the lack of bread. The best variety, however, is given by the ivory gulls, of which Frænkel has shot one today and Strindberg four with two shots. We still drift but apparently slowly, for today we still have New Iceland in sight, our bearings for the day being, on the average, north and west for the two extremities. It presents a charming view in the sunshine, which illumines the glacier both from the edge and from above, thus giving the island the appearance of being transparent. The edge of the glacier contains very blue glacier ice and also brown sections. Of surface moraines there is no trace, and the only dark patches one can discover are shadows. These, together with the formation in general, show that the ground beneath the glacier is not altogether level. Large glacier-calves float round the island, or stand there aground. We photographed the island. Today Strindberg has been very busy house-building, in accordance with a method he has invented. This consists of mixing snow and fresh water, after which the entire mass is built up into a wall and allowed to freeze. The work is both solid and neat. In a couple of days we shall probably have the baking-oven (i.e., the sleeping-room) ready."

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[1] In 1897 Sweden and Norway was still united under a single sovereign. Each nation used its own flag, however, but with the mark of Union in the upper corner.—*Trans.*

The wind had now swung round to southerly but the temperature had fallen to 21.6° F. At 3 p.m. it was clear enough to allow Strindberg to take a place-determination.

"September 20 turned out to be a regular unlucky day. The cooking apparatus (Primus stove) which had hitherto not troubled us much, suddenly became mutinous and refused to do service. The soup stood there mixed but could not be boiled. Great sensation. Frænkel did this and that and experimented with blubber lamps, but got so little heat that he thought it best to take the unburned fat out of the lamp and cut slices out of it, which he laid on Schumacher bread and offered us. That was satisfactory, for it tasted splendid—it tasted just like bacon and bread, and we ate it willingly. By and by I succeeded in getting the apparatus so far in order that we managed, though with some difficulty, to boil the soup so that it could be eaten. It contained 1.3 pounds seal-meat, 5½ ounces seal-blubber, 2 ounces Mellin's food and the rest water. After it had been boiled we ate it with gusto. The seal-meat seems almost to melt away on boiling; after boiling a few minutes it becomes exceedingly tender and delicate. Just when we had finished the meal and that untiring architect Strindberg had gone back to building, he cried out: 'A bear!' Frænkel and I, who were still busy with our cook-stove difficulties, hurried out and then had the pleasure of seeing a magnificent bear quite near us. Strindberg and I were a little too eager, I suppose, for each of us missed, but Frænkel's first shot gave the bear his death-wound. Great joy. We had increased our supply of food until on in April—to the close of winter—and in addition had obtained a magnificent skin. The bear is the polar traveller's best friend. He had come to us from a little floe two or three hundred yards distant through water so frozen that when we afterwards rowed out to it, we had to force our way through the ice with oars and shovel. When he was shot he had just drawn back to his lead, but I suppose he did not want to go in again and swim the long way back, for he turned towards Frænkel and seemed ready to attack. When shot, he slipped down backwards into the water and at once gave up the ghost. We pulled him 'to land' by means of a grapnel, then we got a noose around his neck and a hindpaw and then easily got him out of the water. Our joy was great, for the bear was a big and magnificent animal. He was treated accordingly, was given a noose around each front paw and one round the neck, so that when being towed he glided along hair downwards, and was dragged amid cheers to the camp. There Frænkel and Strindberg rapidly carried out the first part of the butchering, while I returned to my tinker's employment."

Before the bear was cut up and Andrée returned to his work, however, the three comrades had been out on to the thin ice to fetch a large and peculiar bird which Andrée had shot after they had seen it a couple of times. He gives a detailed description of the bird, which Strindberg and Frænkel consider to be "only a young ivory gull and perhaps they are right."

All the while White Island could be dimly seen in the north, for they had now drifted to the south-eastern side.

On preparing the supper, they had renewed trouble with the cooking apparatus, although not so much as before.

"We got bear-steak and the bear-blood pancake ready. The latter, however, under extremely exciting circumstances. More than half the mass (the lower) was solid, but the upper part was in a very fluid condition. The apparatus went out! Strindberg with matches raised. Frænkel ploughs furrows in the pancake in order to make the fluid part run down to the bottom and there solidify somewhat. The pancake was torn into pieces and turned as quickly as possible, and so on, the final result being a delicate cake. Then the cook-stove went out. But we had not had coffee, and we wanted coffee, and so the bother began again. Now all three of us were at work. Frænkel held the cook-stove. Strindberg held the matches ready, I stirred and managed the cleaning-needle,[1] and so we went on making the coffee with increasing hopes, which at last were crowned with excellent coffee.

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[1] Of the stove.—*Trans.*

Tomorrow we shall try to find out what it is that troubles the cooking apparatus. It was most unlucky that the reserve-parts for this were not brought with us from Pike's House! We have now so much meat, blubber, etc. that it is difficult for us to protect it well during the night in case of visits from bears. We pile it up near the edge of the tent, and fence it round with all kinds of other things. The question of getting the house in order is becoming a burning one here in the cold. During the last two days the weather has been very pleasant, but, on the other hand, they have not passed without signs of differences arising between us. I hope, however, that this seed will not grow and develop."

September 21. The three comrades were tired after the preceding long working-day, and not much was done. Strindberg and Frænkel worked at the house, Andrée cut up the seal and shot 3 ivory gulls. The cooking apparatus was repaired after it was found that the causes of the trouble were impurities in the burner, and then they made seal-blood pancake of frozen blood, salt water, bit of meat, seal-blubber, a pinch of yeast-powder, and another of salt. "It tasted excellent," thought Andrée.

September 22. The fog and the misty air continue, so that Strindberg is unable to get any reliable latitude-determination of the positions of the camp and White Island. "Clear weather here seems to be rare," says Andrée. The patchy black guillemots and the ivory gulls were frequently seen and several specimens were observed of the ivory gull youngsters. Strindberg shot a seal with small-shot, and a couple of ivory gulls too were dropped. The party had to be careful with its shooting, however, for they miss the seals pretty often, as the animals do not, as a rule, come so near that they can be hit in the head with small-shot.

Like an omen of coming misfortune "we were disturbed during the night by hearing the floe break, as we thought, right under the building. We were afraid that we had run aground, but our bearings have shown that we are moving, although we seem unable to get away from this island. Probably we are lying in some kind of backwater which the current from the north creates at the south-eastern and south-western corners of the island and along its southern side."

September 23. The temperature has now fallen to 24.8° F.; the sky is covered with clouds, as before.

"Today all three of us have been working busily on the hut, cementing together ice-blocks. As mortar we employ snow mixed with water, and of this mass, which Strindberg handles with great skill, he is making a vaulted roof over the last parts between the walls. We have got on very well, and the hut begins to take form a little. After a couple more days of such weather and work it should not take long before we are able to move in. We can probably carry our supplies in the day after tomorrow. This is very necessary.

"We have now a very good arrangement of the day with 8 hours' work, beginning with 2½ hours' work, followed by breakfast ¾ hour and then work until 4.45 o'clock, when we take dinner and supper in one meal."

They have also tried the meat of the great seal and have found it excellent. One of the best improvements in the cooking is that of adding blood to the sauce for the steak. This makes it thick and it tastes as if they had bread. Andrée considers that blood contains much carbohydrate, for their craving for bread is considerably less after they began to use blood in the food. Of bear, great seal, seal, and ivory gull they have found every part edible, excepting bear's-liver, of course. For want of time they have not yet cut up and weighed the animal they have killed, but Andrée thinks that they now have meat and ham enough to last on into the spring. They must, however, shoot more so as to be able to have larger rations and to have more material for fuel and light.

Now six days pass without Andrée's making any notes. When, on September 29, he once more takes up his pen, the expedition is still on the south side of White Island. The leads have now closed and so the seals have disappeared. The polar bears, on the contrary, have increased in number. On September 27, when the weather was mild and when it even rained for a change—and during the following night—two bears had visited the camp. "The night-bears seem to be a kind of marauder. The one that visited us last night dragged away our big seal twice, and we should have lost it had not Strindberg succeeded in coming so near the bear as to frighten him and making him drop his booty. I tried to hunt a bear in my stocking-feet but did not succeed. This morning, just as we came out, Frænkel saw a bear which we succeeded in enticing to where we were waiting behind our hut. Strindberg shot him through the throat and he fell down at once, but after some moments he got up again and began running, pushing his forequarters in front of him along the snow. I then gave him my shot which laid him on his hindquarters, but this incited him to fresh efforts and he began to run. F. finally got his shot into him and at last the bear lay there in a pool, after which we hauled him up amid hurrahs. It was a big old he-bear."

It awakened great apprehensions when they found that the floe on which they had built their winter quarters began to diminish in the immediate neighbourhood of the hut. The pressure of the ice, too, drives them nearer and nearer White Island. A large line of old hummocks separates them from the shore, and Andrée hopes that this wall will prevent a continued pressure of the ice. "The sounds are magnificent when there is pressure but otherwise it does not appeal to us."

In the evening of the twenty-eighth, the expedition moves into the hut, which is christened "Home." They were fairly comfortable the first night but they hoped it would become much better. They were obliged to keep their stock of meat inside the hut during the night to protect it against the bears.

There are no notes in Andrée's diary for September 29 and 30, but from Frænkel's meteorological journal we know that then the temperature fell so that in the afternoon of the thirtieth it was less than 17.6° F.

October 1 arrives. During the afternoon the temperature falls to 14° F. It was a good day. "The evening was as divinely beautiful as one could wish. The water was alive with small animals, and a bevy of 7 black-and-white guillemot youngsters were swimming there. A couple of seals appeared too. The work with the hut went on well, and we thought we should have the outside ready by the second. But then something else happened. At five-thirty o'clock in the morning, we heard a thunderous crash, and water streamed into the hut. And when we rushed out we found that our large, beautiful floe had been splintered into a number of little floes, and that one fissure had divided the floe just outside the wall of the hut. The floe that remained to us had a diameter of only 80 feet, and one wall of the hut might be said rather to hang from the roof than to support it. This was a great reversal in our position and our prospects. The hut and the floe could not give us shelter, and still we were obliged to stay there for the present at least. We were frivolous enough to sleep in the hut the following night too. Perhaps it was because the day was rather tiring. Our belongings were scattered among several blocks and these were drifting here and there, so that we had to hurry. Two bear carcasses, representing provisions for three or four months, were lying on a separate floe, and so on. Luckily the weather was beautiful, so that we could work in haste. No one had lost courage; with such comrades, one should be able to manage under, I may say, any circumstances."

The catastrophe early in the morning of October 2 concludes the last phase in the ice-wanderings of the Andrée Expedition. They have maintained themselves on the pack-ice since July 14. During this period the three men had tried for many days to march towards Franz Joseph Land, and then for many days towards the Seven Islands. The ocean current had placed insurmountable hindrances in their way, which had prevented them from reaching either of their goals. Ever since the moment they sprang from the basket of the Eagle and set foot on the ice they had been the prisoners of the ice. But it was not until after a struggle lasting many days that they were defeated and surrendered themselves as prisoners. Now the ice-floe on which they intended to spend the whole winter, or a great part of it, had broken and lay splintered around them. Their "Home" was in fragments, and their belongings were scattered. "Exciting situation," are the only words Strindberg writes for October 3 and 4. No one loses courage. White Island with its sheath of ice lay before them!

X

On White Island

"Our ice-floe broke close to the snow-hut during the night." This is the laconic note made by Strindberg in his almanac on October 2 respecting the tragic end of the hopes attached to the hut on the ice-floe, a hut of which he had made the drawings and whose builder he had been.

On September 28 the hut stood ready for the party to move in. For the first time since leaving Spitsbergen the men were able to rest during the night within the shelter of solid walls. Everything promised well, and the supply of meat was rich, as it had scarcely ever been at any previous time during their days on the ice. The evening of October 1 was "as divinely beautiful as one could wish," writes Andrée. Then came the catastrophe—the ice-floe broke close to the snow-hut. "When we rushed out we found that our big, beautiful floe had been splintered into a number of little floes, and that one fissure had divided the floe just outside the wall of the hut." It is in the face of this situation that Andrée writes the fascinating words with which his great diary closes: "With such comrades, one should be able to manage under, I may say, any circumstances."

The situation being what it was, there was clearly nothing to do during the night between October 2 and 3 but remain in the hut, even though Andrée himself characterizes this as an obviously frivolous action. We do not know whether by these words he refers to some especially dangerous episode occurring in the ice-hut during the night, but, for October 3 and 4, Strindberg has written in his almanac: "Exciting situation." Events now seem to have developed in quick succession. On October 5, Strindberg writes:

"Moved to land"; for the sixth: "Snow-storm reconnoitring"; and for the seventh: "Moving."

Unfortunately, the remarks in Andrée's own hand fail us here. When the scattered relics of his body were discovered by the crew of the *Bratvaag,* there were found, among other things, in the left inside pocket of his jacket a memorandum-book and a lead-pencil. This book contains the last notes written by his hand, but unfortunately they have come to us in a very fragmentary condition. The place where Andrée sank into his last slumber, and which was marked merely by the clothes that had covered the upper part of his body, was so high up against the slope of the cliff that the ice which covered it has certainly melted away several times during the thirty-three years that have elapsed. As a result, the book has been incessantly exposed to the action of the air and the summer heat, and mould has grown rankly from the glue of its covers. In consequence, only the outer edges of the pages have been preserved, while the parts of the leaves lying towards the backbone of the book have become in many places a complete pulp. In spite of the extreme care that has been taken to preserve the written parts, it has not been possible to save more than a few fragments of Andrée's last words to those who should come after him, and these fragments are difficult to decipher. Andrée's last words were not many, for the text embraces no more than four and a half pages. His notes must have ceased entirely shortly after the landing on White Island on October 5.

At the top of the first page there was evidently written the year 1897. The text on this page seems to be concerned with the events on the ice-floe. The first line ends with some reference to "cutting" and probably indicates the carving up of game they had caught. Two lines lower down we can read: "the hut hung," which can hardly refer to anything but the situation, already mentioned, when the ice-floe broke. In addition we find on Page 1: "field-glass [?] [obser]vation" and "the lowland"—notes which we may suppose to deal with an orientation made from the ice. Finally, at the foot of the page, there are the words "on the island" and this can only mean White Island.

On the following page mention is made of the morning of the fifth, and as the page begins with the words: "in the evening 5" these would seem to mean the time when the notes were made. It is the day on which Strindberg states that the moving to shore took place. This quite agrees with the statement in the text at the foot of the page that they had christened a place—undoubtedly situated on White Island—by a name of which we can now merely distinguish: "M . . . place." There is something tragic in this ruined text. How splendid if we could now but restore to it the name this place received on October 5, 1897, the date of the first landing which, as far as we know, had ever been made by any geographical explorer on White Island! On this page of the book mention is also made of glaciers and northern lights.

The page following is dated the sixth and, consequently, the remaining two and a half pages of the text of the diary must describe the events of the day or days immediately after the moving to land. On the third page, mention is made of heavy wind. In addition, the text seems to have contained notes concerning the physical features of the island, as mention is made of "stone-brash," "gravel," and, possibly, "great ridges." The page concludes with this text: "in darkness . . . in the snow-hut . . . transport of the goods . . . neighbourhood. This was . . . done." We remember that, in his almanac for October 6, Strindberg has noted: "Snow-storm reconnoitring" and, for the next day: "Moving." Under such circumstances we feel entitled to give the following reading of the fragmentary text: Amid heavy wind with mingled snow and rain they have reconnoitred the ice-free south-west point of the island, and have found that the ground consists of stone-brash and gravel. Down by the shore the sledges still remain drawn up to the spot where the landing took place. They have, however, found a place higher up on shore which has been chosen as the camping-place—evidently the same which was found by the *Bratvaag*—and there they probably prepare or work at the construction of a snow-hut. Then the goods are transported from the shore to the immediate neighbourhood of the camping-place. It seems most probable that this is the "moving" noted by Strindberg on October 7, that we meet in the fragmentary text at the bottom of Page 3.

On the following page mention is again made of the glacier. And, at the bottom, there is an obvious reference to ivory gulls in the following text—with one or two proposed interpolations—" . . . and intestine . . . envious now give . . . impression (not of) innocent white doves but of (real) carrion birds." This is the last of the many observations on natural phenomena written by Andrée during his life.

We have now reached the last page of Andrée's diary notes. Although not more than half of the page has been written on, still, from our point of view, it is the richest in content, for here mention is made of "the tent" and "the hut," and then the notes conclude with the following lines: "driftwood . . . to move about a little . . . (p)ermits." The meaning of this would seem to have been: The weather is bad and they fear they will be obliged to keep within the tent the whole day. It is evident that they are planning, perhaps are even engaged on, the task of building the aforementioned hut, which is to give them better protection than the weak tent. Finally, they intend to collect driftwood so as to be able to move about a little within the small space afforded them. The possibility of obtaining exercise is, of course, of great importance if they are to keep heart.

So far the diary. We now know that the hut was never erected. As for the tent mentioned on the last page of the diary, it is evidently the same one that was discovered round about Frænkel's remains on the occasion of the visit of the *Isbjörn* on September 1, 1930. In the neighbourhood of this spot there was also found driftwood which had evidently been carried there and piled up. It is not possible to state with exactness the day on which Andrée laid down his pen for ever, but to judge by all appearances, his notes do not go beyond the first week in October.

The above is all that we have learnt respecting the arrival of Andrée's expedition at the spot where they were to meet their final fate, the spot where they were to remain hidden from the world for a third of a century. There remains only one more word from the three. It is that written by Strindberg in his almanac on Sunday, the seventeenth: "home 7.05 a. m." But from that moment there is only inexorable silence; the whole desolate silence of the polar world encloses the three heroes in its icy embrace. What time passed before it put an end to their existence? It will never be possible to give a precise answer to this question.

It is not much that these comrades themselves have to tell us about the last phase of Andrée's Polar Expedition. What happened on October 2 seems to have been a catastrophe. On that day the notes in Strindberg's observation book cease. One may object that, after the landing on the fifth, no fresh observations were necessary; their position had now become fixed. But on October 3 all Frænkel's notes, in the journal of meteorological observations he had hitherto kept, come to an end. By a freak of fortune, Andrée's first diary ends at the same time. Strindberg has made daily remarks in his almanac up to October 7, and Andrée has continued his description of the lot of the expedition to about the same date.

On Tuesday the fifth, the party has succeeded in landing on White Island. They stand on solid earth for the first time since July 11. The next day comes the first snow-storm, yet they do not capitulate to fate. They still put their hope in the future, and they reconnoitre, although they know with certainty that they are now imprisoned in one of the most inhospitable tracts of the polar world. The very next day—Thursday the seventh—they move the sledges with their supplies higher up on the shore to where they have pitched their tent, and they prepare to build a hut and to collect driftwood for the winter. Then their voices become silent, to be heard only once more in Strindberg's short note on the seventeenth. Has the situation, from being "exciting," as Strindberg put it, developed into one that is serious, so serious that it has made them lose heart? This is the great note of interrogation at the close of Andrée's, Strindberg's, and Frænkel's journey, but, strictly speaking, it is also the last and the only one. If the vaguest answer to this query is anywhere to be obtained, it must be sought for in the remains of the camp that have now been brought back to Sweden.

Supplement

THE PHOTOGRAPHS OF THE ANDRÉE EXPEDITION

Development of the Photographs of the Andrée Expedition

By J. Hertzberg

It was with very small hopes of being able to develop any pictures, or even of obtaining any traces of pictures, that I received the rolls of film handed to me for examination and treatment. We know from experience that a latent photographic picture grows fainter and will even disappear in course of time, especially if the time of exposure has been short; and in the present instance this last factor had to be considered seriously. We also know that the celluloid basis of the film is not completely inert, but sometimes acts on the emulsion coating so as to produce, in the course of time, an ever-increasing cloudiness. It is this fact which leads the manufacturer always to fix a period within which the film must be developed if the picture is to be a clear one. For the Eastman Kodak films which the Andrée Expedition exposed, this period came to an end in February 1898. There are, however, examples of films, properly exposed, and preserved in a cool, dry place, or at least not subjected to great variations of temperature, which have given serviceable, even though very cloudy, negatives, after some ten, and even twenty years.

But in what state were the films brought back to Sweden from White Island? The first condition—a low temperature during the period of preservation—may be considered as having been satisfied, at least until the date when the find was made, but the second condition—absence of moisture—was, on the other hand, far from being fulfilled. According to the information given me, the metal cylinders in which the films were found were partly filled with water, and, when the cylinders were opened, all the films proved to be soaked. Moreover, to judge by all appearances, they had been in that state for many years.

The following is a very brief account of the methods of procedure in my treatment of the photographic material of the Andrée Expedition:

The material I received from Professor Lithberg consisted of:

9 cylindrical containers of galvanized iron; length 4.36 inches, diameter 1.48 inches.

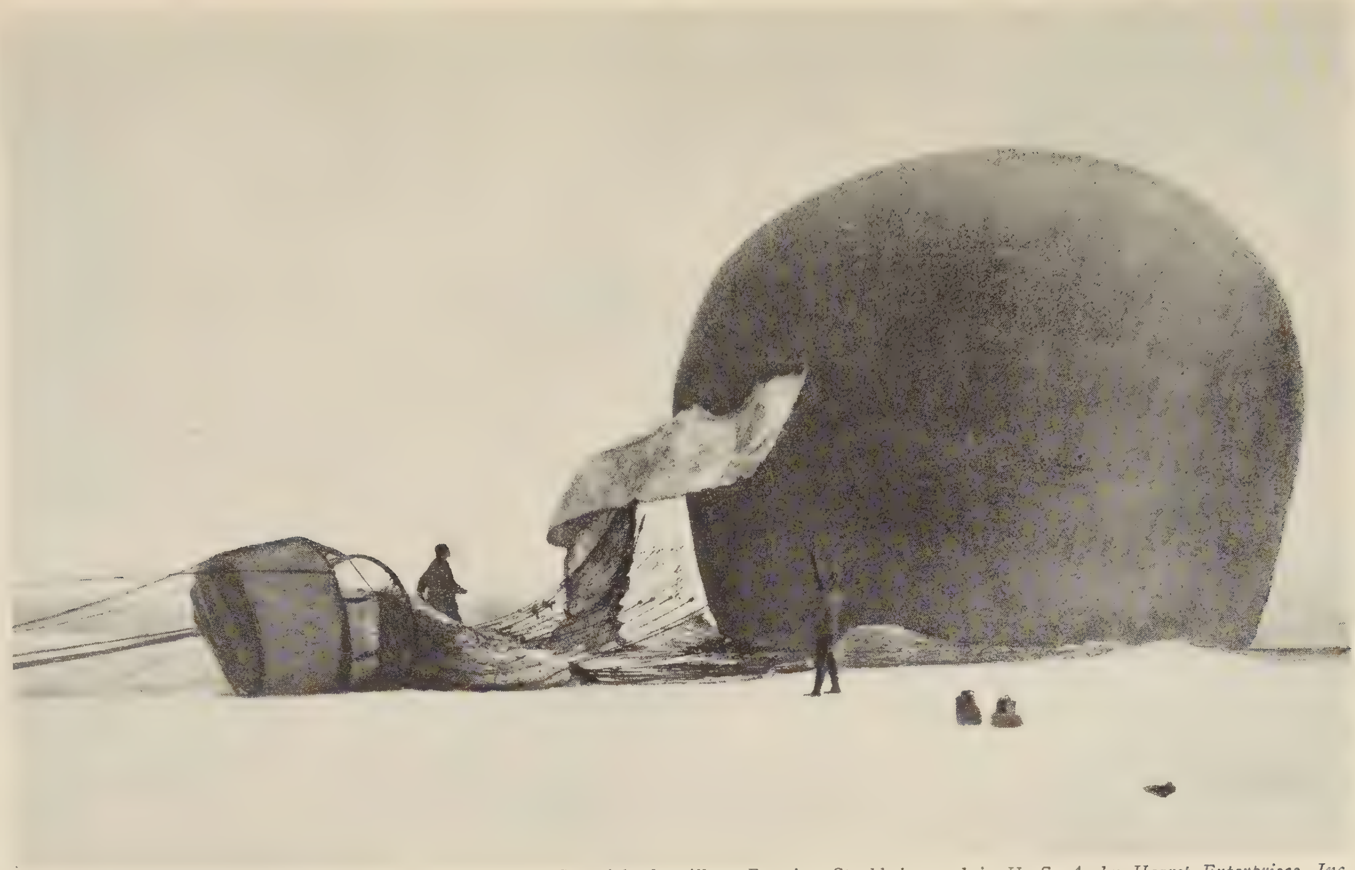
7 cylindrical containers of copper; length 5.8 inches, diameter 1.48 inches.

1 roll of films (unexposed) wrapped in a piece of black-and-red cloth (evidently from a photographer's kit).

1 film cassette containing a roll of films 13 x 18 cm. (5.2 x 7.2 in.), some of which had been exposed.

All the cylinders received were numbered and weighed.

An ocular examination in a darkroom of the contents of the galvanized iron cylinders, which were greatly affected by rust, showed that they contained film-rolls intended for loading by daylight, of about the same



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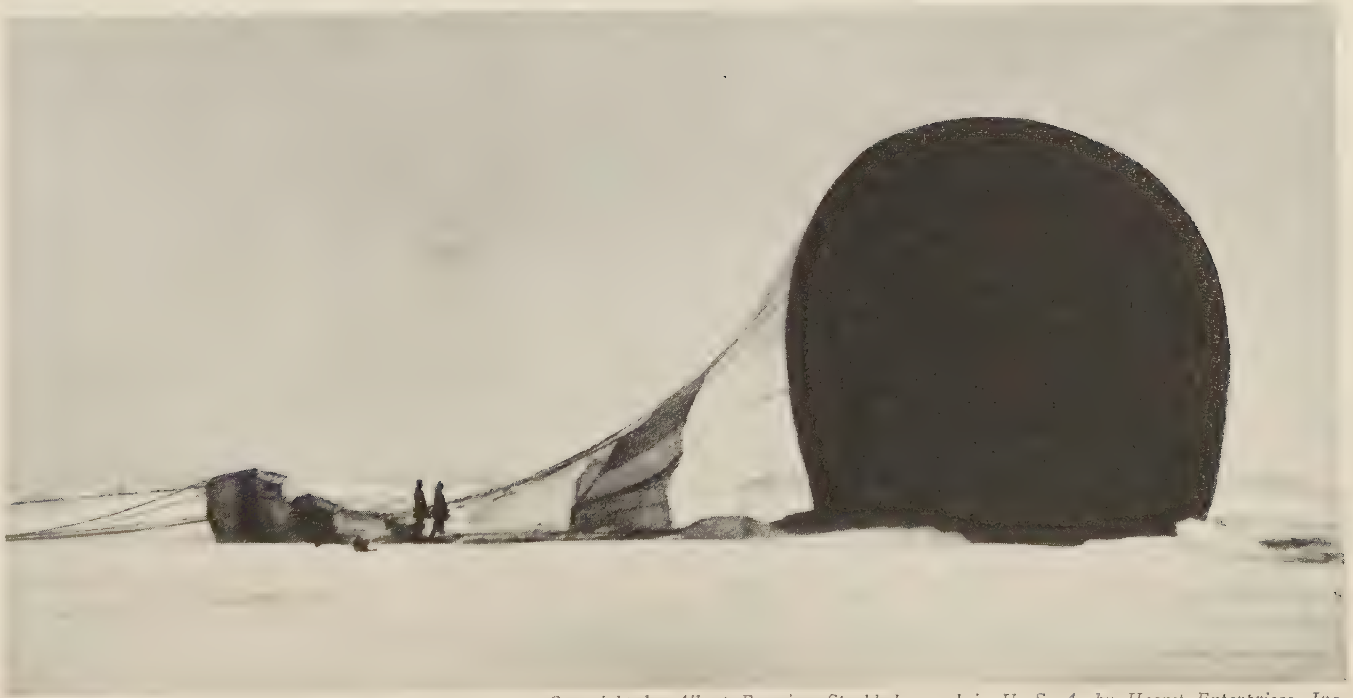
The Eagle, immediately after landing on the ice-floe, July 14.



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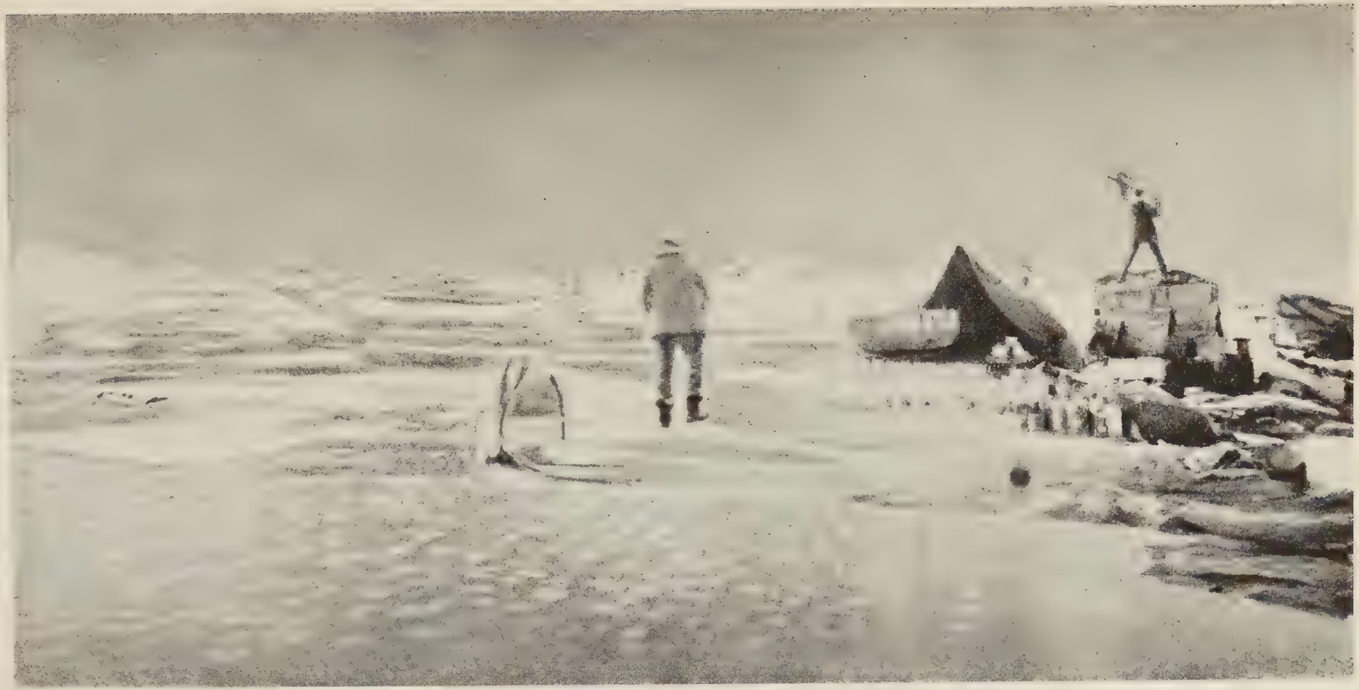
The Eagle, after landing on the ice-floe, July 14, taken somewhat later than the previous picture.



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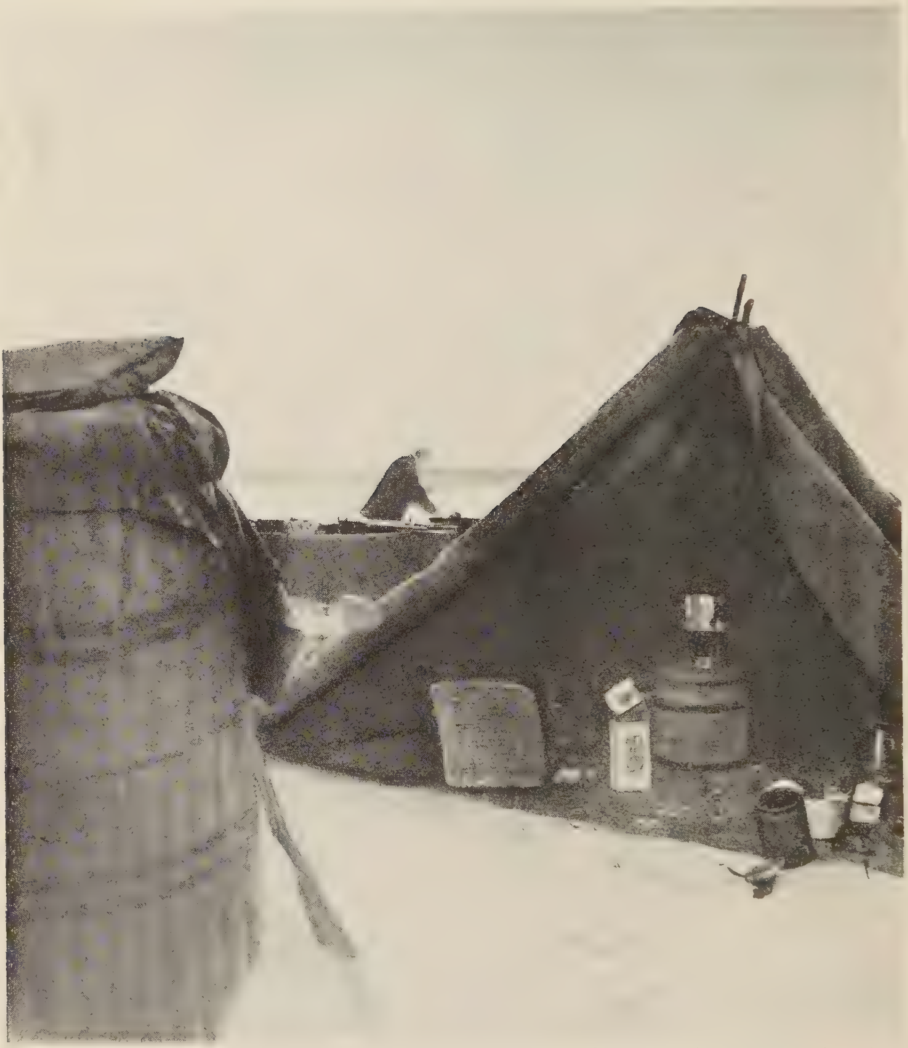
July 19. Andrée twice went up on to the roof of the car of the fallen balloon, and carefully examined the horizon in every direction.



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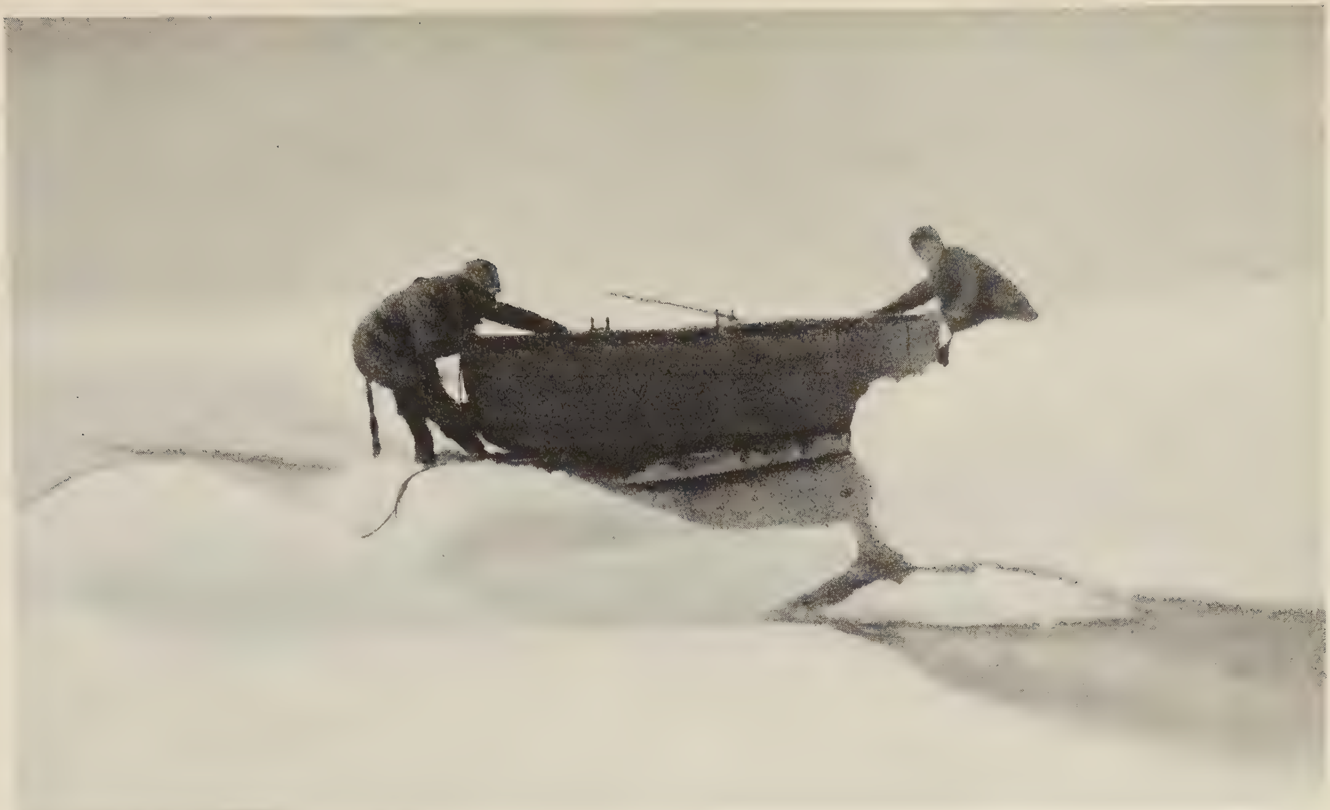
The camp at the landing-place of the Eagle. To the left the car; to the right the tent; a glimpse of the boat can be seen between them. In the tent there can be seen, besides the provisions and the cooking utensils, the cook-stove in the middle, and a provision-basket to the left.



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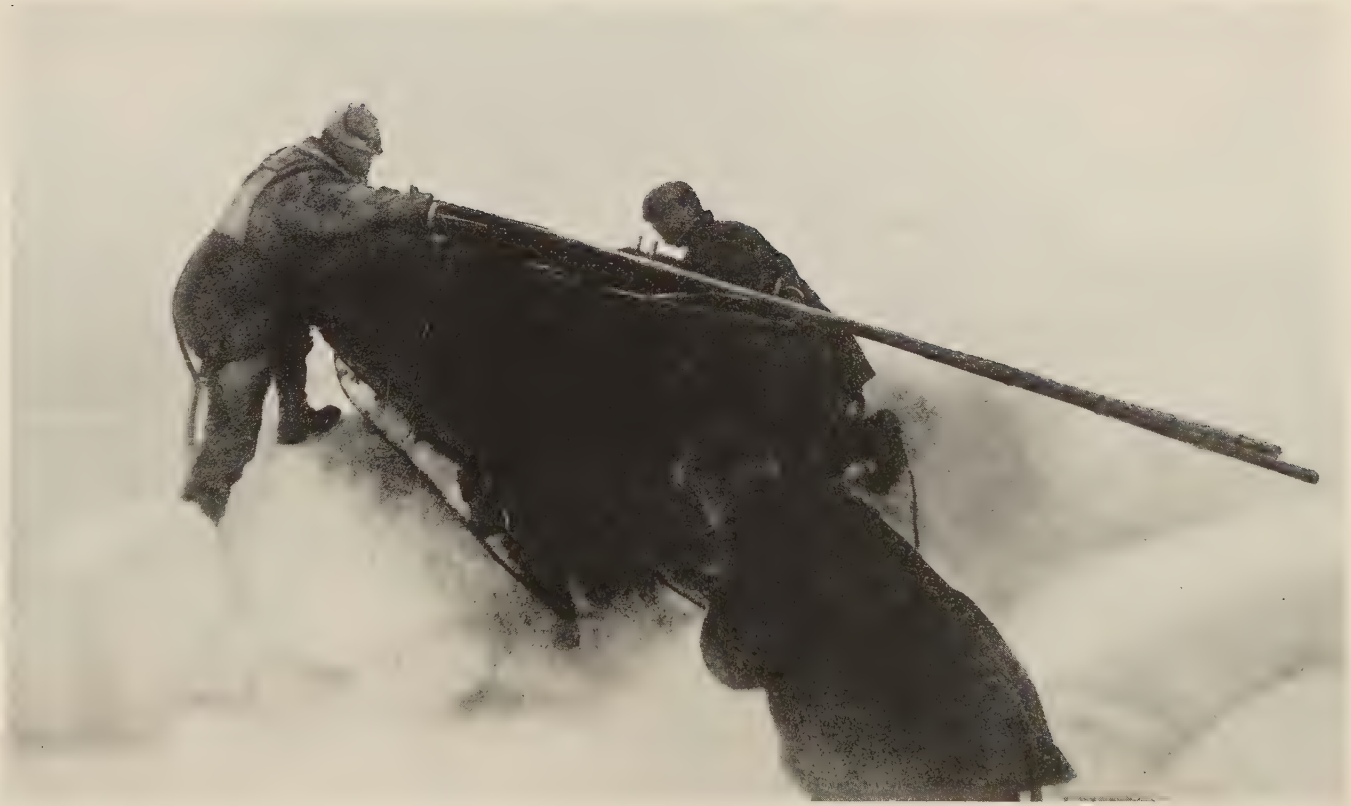
Frænkel's sledge with the boat being dragged between the blocks of ice. Andrée (right) and Frænkel.



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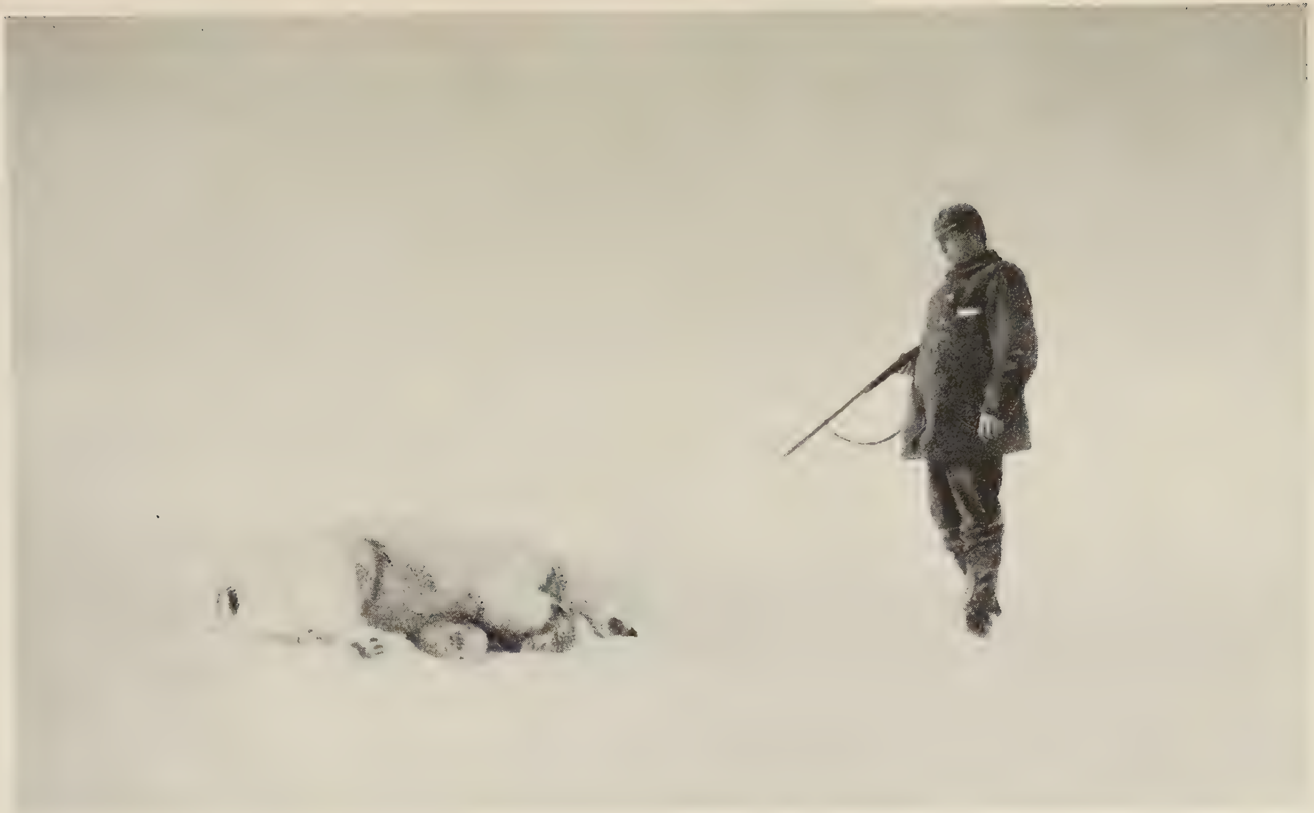
Frænkel's sledge with the boat being pushed across a wall of pressure-ice. To the left Frænkel; to the right Andrée; in the middle Strindberg. The lens of the camera was evidently provided with an automatic shutter.



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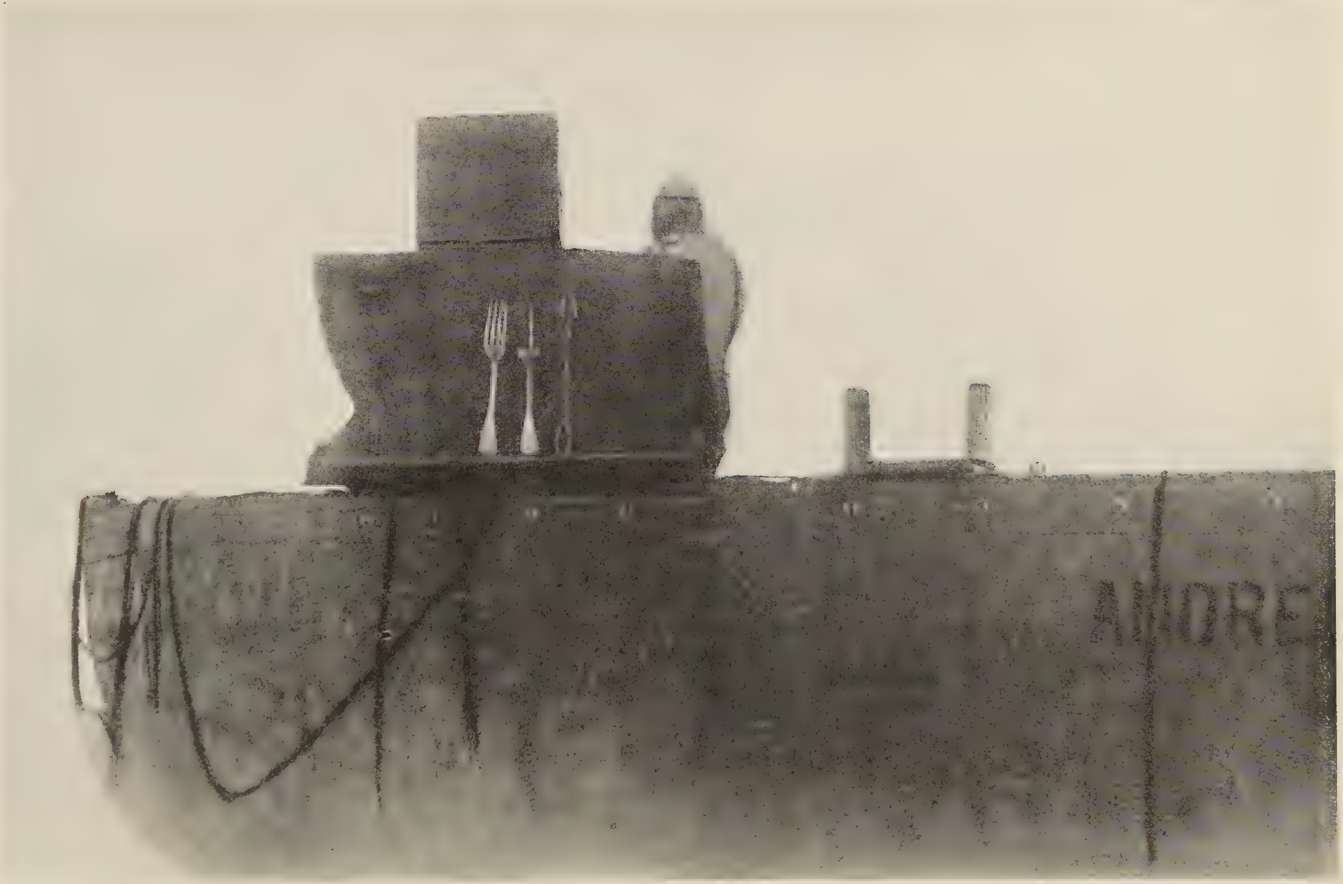
Andrée close by a bear which has been shot. Probably taken on July 19.



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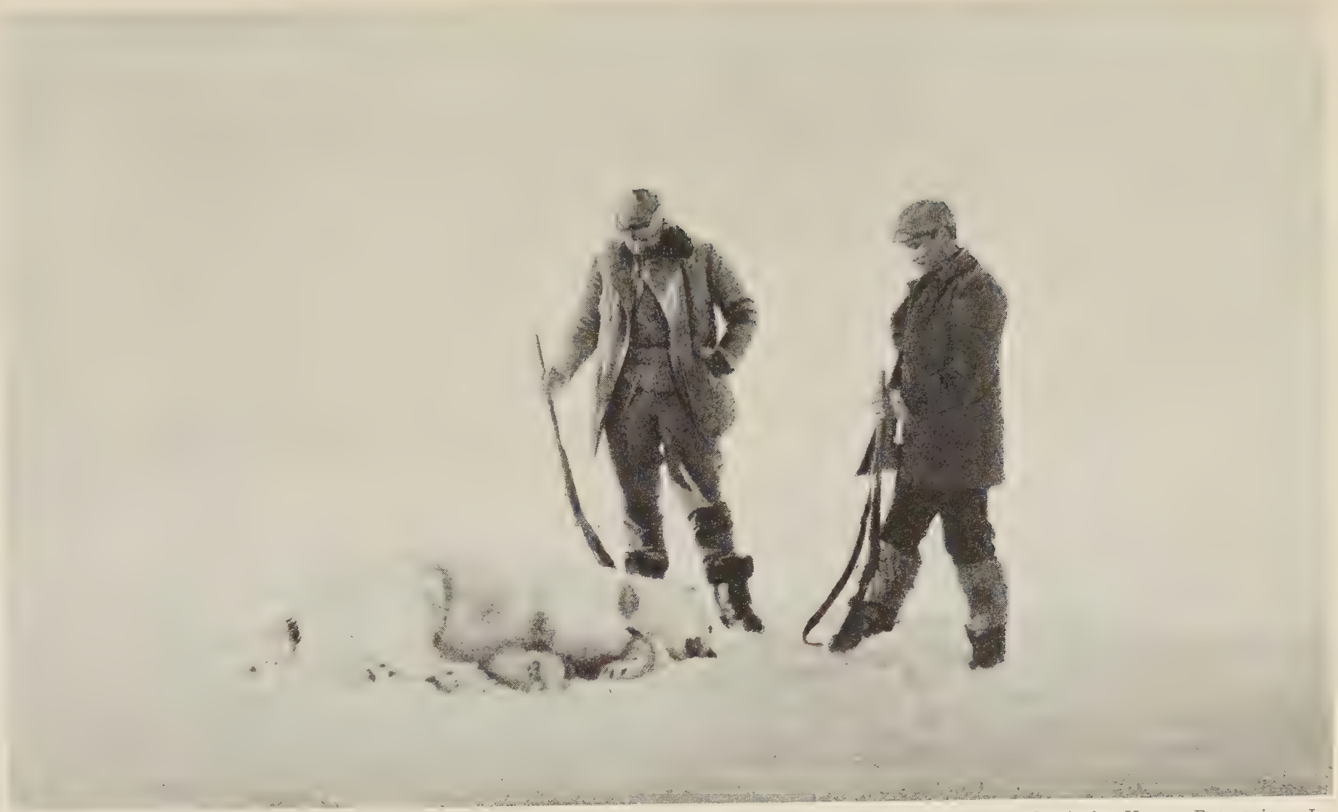
August 3: "We photographed the story of the development of our forks. I made a fork for Frænkel." The latter fork to the right.



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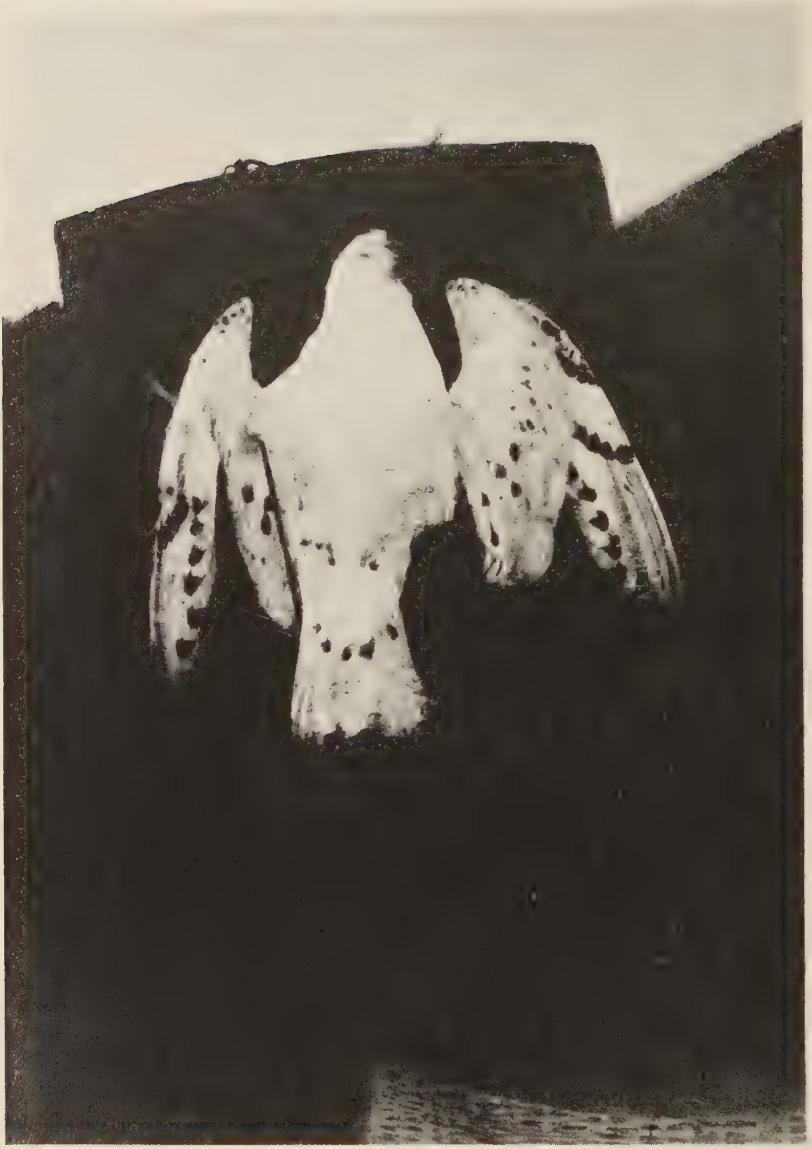
A welcome bag. Frænkel (left) and Strindberg.



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A young ivory gull put up near the tent to be photographed. Probably the specimen shot by Andrée on August 22.

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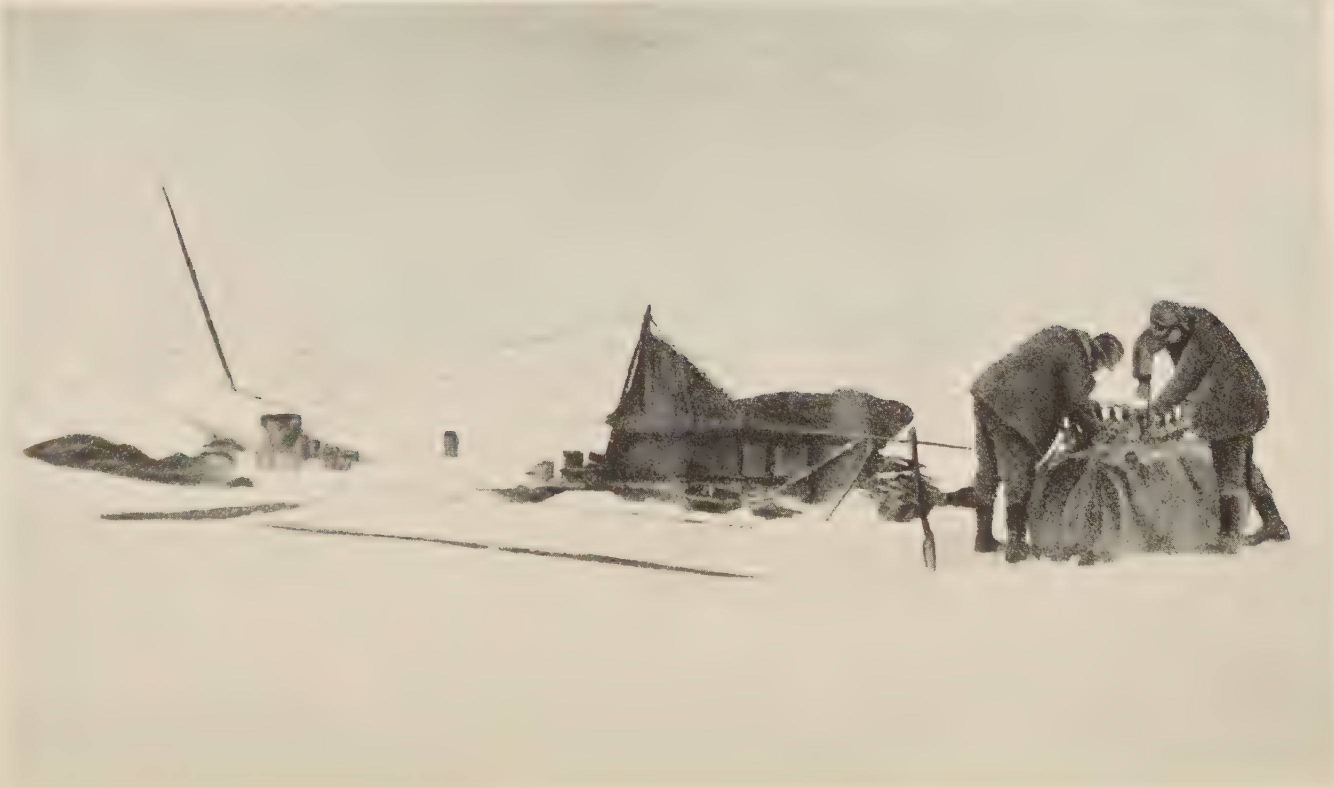
Andrée (left) and Frænkel with a slain bear.



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Breaking camp. Frænkel (left) and Andrée. The boat is upside down.

type as those still employed. From the way in which they were rolled up, it was obvious that none of them had ever been placed in the camera; they were, therefore, all unexposed.

An examination of the contents of the copper cylinders revealed that each contained a roll of films to be loaded in the cassettes which accompanied them. The films were in long "ribbons" or bands, 5.2 inches broad and 34.64 inches long, to hold 48 pictures (5.2 x 7.2 in.). By the way in which they were rolled it could be seen that, of the 7 rolls, 4 had been exposed and the other 3 unexposed. They were not protected by interleafing paper, but were wound tightly on a cylindrical wooden spool. All the lengths of film down to the spool were wet, some of them to such an extent that the layer of emulsion came off from the underlying celluloid if merely touched by the finger. Fortunately, when Mr. Köhler took charge of the films at Tromsö, he had emptied off the water which had not been absorbed by the layers of emulsion and the black paper wrappings. Had this precaution not been taken, the water, on being brought into a milder climate, would certainly have dissolved and destroyed still further the layer of emulsion. My first step, after numbering and weighing the cylinders, was to unroll the films from the spools and dry them. This had to be done with the greatest possible caution, because of the decomposed condition of the emulsion, and the brittle state of the celluloid. I succeeded, without injury to the emulsion, in separating the film from the back of the roll underneath, to which, of course, the moist layer of gelatine was firmly stuck. The unexposed films, too, were dried. Since these had been found in their original packings, they were much better preserved than the exposed films, but even they were wet through to the spool. Part of this unexposed film could be used for the experiments which I carried out before beginning to work on the exposed films.

These preliminary experiments were made in order to discover the nature of the material before me, and also to discover suitable methods free of all risk. My task was to rescue from the susceptible and valuable material the traces of pictures which might possibly lie concealed there, and to waken to life the seed sown one-third of a century ago. The problem was to find a developer with energy enough to bring out the latent pictures, and yet to repress the tendency of the emulsion to become "veiled" or cloudy.

Several developers were tested in varying combinations. By far the best results were obtained with a sulphite-free pyrocatechin-caustic soda developer. Besides possessing extremely high reducing properties, it can also form a yellowish-brown oxidation product on the reduction of the silver bromide to metallic silver. Thereby, in addition to the silver picture, there arises a yellowish-brown picture, the intensity of which is proportional to the precipitation of silver. This gives an intensification of the picture which is quite faint to the eye, but which, by its yellowish-brown colour, easily absorbs blue and violet rays, a characteristic which can be utilized in the manner described below.

The film was developed bit by bit, with varying results. When the work of developing was ended, there had been obtained, from the 192 exposures contained in the four ribbons of film, some 50 positives that showed more or less evident traces of pictures. Of these, 20 were so clear that it seemed possible they might give reproducible pictures after proper treatment. Then followed some very elaborate processes. As mentioned above, we had developed, in addition to the silver picture, a faint yellowish-brown one. By recopying on a diapositive material chiefly sensitive to blue and violet rays there was obtained a relatively powerful diapositive, which could be strengthened by further recopying. It is a fairly easy task to achieve a picture rich in contrasts with the aids that photography now has at its disposal, but it is considerably more difficult to give, with correct values, in reinforced forms, the soft and extremely faint gradations which the original negative contains. I succeeded, however, in overcoming this difficulty, too, thanks to my having at hand a supply of negative and positive materials of greatly varying gradation.

Part Three

THIRTY-THREE YEARS LATER

XI

The BRATVAAG *Expedition Discovers the Camp*

By DR. GUNNAR HORN

THE Norwegian expedition to Franz Joseph Land in 1930 was carried out by the sealing vessel *Bratvaag* of Aalesund, its purpose being to make scientific investigations of the island mentioned and of the neighbouring tracts, simultaneously with the vessel's pursuit of the ordinary seal-fishery during its stay in the Arctic seas.

In the autumn of 1929, the "Norwegian Svalbard and Polar Sea Research Institution" of Oslo, the leader of which is Adolf Hoel, Lecturer at the University there, had already proposed that a scientific expedition should be sent to Franz Joseph Land during the summer of 1930. The Institution was created by the Norwegian Government for the purpose of investigating the Arctic tracts, and the State pays the main part of the expenses of this work, although contributions are also received from scientific and private funds. The Norwegian Government had made a grant towards the proposed expedition to Franz Joseph Land, which was supplemented by a donation from Carl J. Christophersen, an Oslo merchant.

The sealer *Bratvaag* was hired as the vessel to be used for the expedition, but on the condition that all profits from sealing and other hunting sources should belong to the owners of the vessel. In this way, the journey became a combined scientific and sealing expedition.

The members of the expedition were: the engineer Dr. Gunnar Horn, geologist of the Norwegian Svalbard and Polar Sea Research Institution, who was to act as the leader of the scientific work; Olaf Hanssen, botanist; Adolf Sörensen, zoologist; Peder Eliassen, the commander of the vessel; Ole Myklebust, first harpooner; Sevrin Skjelten, second harpooner; Nils Lange, engineer; Bjärne Ekornaasvaag, assistant engineer; Hans Laabak, steward; Karl Tusvik, Leif Nedregotten, Magnar Festö, Syver Alvestad, Johan Almestad, Olav Salen, Sigurd Myklebust, and Lars Tusvik, sealers.

The sealer *Bratvaag* is owned by the MS Bratvaag Co., whose managing director is Harald M. Leite of Aalesund. The vessel is a wooden sloop, built in 1921 for Arctic waters and has a gross tonnage of ninety-six tons. It is fitted with a 120 horse-power Bolinder motor, which gives it a speed of seven to eight knots. The *Bratvaag* is not provided with a wireless apparatus, although the expedition had an ordinary radio-receiver on board.

The *Bratvaag* started from Aalesund, a lively place known for its energetic participation in the polar sealing and fishing industries. The polar fishing-fleet of the town has increased during the last ten or fifteen years especially, and at the present time the town boasts the largest and most up-to-date fleet of this class in Norway. We left Aalesund on the afternoon of July 26, and on August 30 arrived at Tromsö, the pre-eminent Polar Sea town, which is the starting-point of so many polar journeys. It is, too, the place where many celebrated expeditions have received their first welcome on their return from hazardous work well done.

We left Tromsö at eight in the evening, and followed the usual route taken by vessels through Ulfsfjorden. The following morning we found ourselves on the west side of Sör Island, whence we steered out to sea, keeping a course to Hopen. There was some swell and a faint north-easterly breeze. On August 2, we took a midday altitude which gave us 70° 22′, so that we had 180 nautical miles left to Hopen, the first intermediate station. Towards the forenoon we came into a fog which lay like a mantle over the water, but it was not dense enough to prevent our seeing the blue sky above. We were now lying athwart Hopen, which we should have had to westwards, and there was nothing to do but try to sound our way to the island, where we very much wanted to land. We bore off to westward, thinking that the island could not be very far off.

Captain Peder Eliassen is on the bridge. He is a skilful polar sealer, who for the last twenty years has sailed all the fishing-grounds of all the Arctic seas. Calm, cautious, and liked by all on board, he was the best skipper we could have hoped for on such a voyage. Ole Myklebust of Vartdal, the first harpooner, stands in the bows and takes soundings. He has known Arctic waters for twenty-one years, eighteen of them as harpooner. Big, strong, and jolly, he never misses! The lead is thrown—63 fathoms! The line is pulled on board and, after a minute or two, whizzes down into the leaden-grey water again. Forty-eight fathoms . . . 21 . . . 16 fathoms! The *Bratvaag* still moves on awhile, and at last we catch sight of land, a shadowy darkness amid the fog. The sea is quite calm, and the silence is broken, now and then, only by the whirring of the flocks of auks as they fly past. The anchor is let go, and we get ready to go ashore.

It was early in the morning of August 3 that we landed. Olaf Hanssen, our botanist, was in ecstasies at being able to work in such virgin tracts. The zoologist of the expedition, Adolf Sörensen, had his first station here; he carried out "scrapings" as he sat in the motor-boat, and brought to the surface a number of interesting and remarkable specimens. This was Sörensen's first trip to Arctic waters. Both the men were greatly devoted to their special branches; they were agreeable companions, and very good company.

But we were unable to devote much time to Hopen. In the morning the fog lightened a little, and we could follow the land with our eyes all the way to its southern point. Then it became dense again, and we went on board and set our course towards King Charles Land, east of Spitsbergen.

The group of islands is not always easily accessible. We were to have been off Abel Island on the morning of August 4, but could see nothing in consequence of the everlasting fog. Then, when it seemed most dense, the fog cleared, and we saw that we were just off the low coast of the island. We went a little nearer and anchored, after which we all went ashore on the low basalt cliffs which form Abel Island. Because of the fog and the short time we had at our disposal, we were unable to remain very long on the island. Our goal, of course, was Franz Joseph Land, where our real work awaited us, and it was necessary for us not to come too late to our destination.

To avoid the shallows, we turned south, rounded the island, and then headed north again along its eastern coast, directing our course to Great Island, which lies on the eastern side of North-East Land. It is usually difficult to carry out scientific work in that region because of the unfavourable ice conditions, but this summer the conditions were ideal, that is, there was no drifting pack-ice. The season, therefore, offered a very rare opportunity for investigating and mapping these tracts—an opportunity which, unfortunately, we were unable to ultilize to the utmost, as the main object of the expedition's journey lay elsewhere.

Great Island is an ice-covered bit of land, about eleven miles in length, lying some nine miles from the north-east coast of North-East Land. The ice-covering has the form of a shield, lying like a solid vault above the fells of the island. The naked land projects in a few places, especially on the southern and north-eastern coasts.

On the morning of August 5 we should have been off Great Island, but the fog rose above our heads like a wall, and we were obliged to stop and wait for better weather. We had not to wait long, for, suddenly, through a rift in the fog, we caught sight of the symmetrical ice-cap of the island, a little to our west. We set our course towards the south point of the island, where a dark little strip of naked land extended from beneath the glacier.

On the north-eastern side of Great Island it seemed as though there was a rather extensive, snow-free tract where walruses might be found, and so we sailed northwards to inspect the lay of the land. From the *Bratvaag* we could see somewhat inland a pole which undoubtedly marked a cache or depôt. Here we went on shore, and found, as we had expected, a depôt. It proved to be one made in 1928 for the purpose of giving possible assistance to the missing members of the Italia expedition, and to Roald Amundsen and his companions. By the side of the depôt we erected a little hut for sealers and expeditions that might be in want of such shelter.

Here the glacier descended precipitously into the sea, but towards the ice-free lowland, it sloped more gently, permitting of an easy ascent. I went for some distance over the glacier. To the north there was open sea as far as the eye could reach. In many places close to the island there were icebergs aground, but the much-feared polar pack-ice was so far off that it could not be seen. We could probably have gone far north this year, but, fine as it would have been to try to set a record, we had to turn eastward again. We weighed anchor in the afternoon and steered direct east. Again we ran into fog, which seemed to be bent on persecuting us this summer. We made our course towards White Island—the easternmost outpost of Svalbard. On some charts it is also called Giles Land. On the old Dutch charts—for instance, on that drawn by the cartographers Giles and Rep in 1710—there is shown to the east of Great Island the west coast of "Commander Giles Land, discovered 1707, ice highland." People have been doubtful as to what Giles and Rep meant by this land, but if consideration be paid to its position and the distance from Great Island, it is natural to suppose that Giles Land is identical with White Island. In clear weather one can see all the way to White Island from Great Island, and the Dutchman who had been on the latter must certainly now and then have seen the white cupola of the former. But in the many years that followed one did not hear much about Giles Land. The whalers restricted their voyages to more accessible latitudes and went very unwillingly to these waters, which as a rule must have been impenetrable for the sailing vessels of those days, not equipped for forcing the ice.

In the sixties of the last century some Norwegian sealers visited the tracts east of North-East Land, and in 1876 White Island was sighted by a well-known sealing-skipper, Johan Kjeldsen of Tromsö, who gave the island the significant name it now bears. Geographical research owes a deep debt of gratitude to these whaling- or sealing-skippers who, while in the pursuit of their calling, made many important geographical discoveries and scientific observations of future value. Nor must it be forgotten that it is on the basis of the experiences of Norwegian sealers on board their vessels amid the Arctic ice that so many polar expeditions have been able to accomplish their valuable work.

In 1887 White Island was again seen, on this occasion by Captain E. H. Johannesen, who called it New Iceland, and in 1898 it was visited by a scientific expedition, the Swedish Polar Expedition under the leadership of Nathorst. The party landed there, but the conditions of the ice made their visit a very brief one. Still, we have this expedition to thank for important information respecting the natural character of the island. In 1925 the British Worsley-Algarsson Expedition in its ship the *Iceland* passed to the north of the island and observed that it lay farther to the west than had previously been supposed. Although the island is seldom visited by sealers, one may be certain that they have sometimes landed there, for it is a good ground for walrus. These animals are best shot when they lie on shore, and so the sealers must have landed when they lay off the island to make their catch. Generally the island is surrounded by pack-ice, making it one of the most inaccessible places in the Svalbard archipelago, but when we steered eastward on August 5 the sea was almost entirely free from ice.

The fog lightened when we came into the vicinity of White Island, and to the north-east we caught sight of the white cupola of ice. We had then sailed about thirty-one miles from Great Island. We were delighted to have reached the "inaccessible island" with such ease, and overjoyed at the opportunity to visit it even if only for a very short time. We little imagined that our visit to White Island would result in solving the riddle of the fate of the Andrée Expedition, and thus throw a light on one of the most mysterious chapters in the history of polar exploration.

It was a magnificent and impressive view which presented itself to our eyes—a dazzling white shield seeming to float on the waves from which it rose in precipitous walls of ice. The sea lay like a mirror in the bright sunlight as we cautiously approached the island. Roundabout us lay immense icebergs aground. It is dangerous sailing here, especially as not a single sounding is marked on the chart, so it is fortunate that the numerous shoals and reefs are pointed out by the icebergs. Eliassen manœuvred his vessel with great caution, and soundings were taken the whole time. We were now on the south-west side of the island, and, on approaching, we caught sight of a low-lying snow-free stretch of land which projected from beneath the white foot of the glacier like a dark line. Soon afterwards we anchored half a mile from land in nine fathoms of water and prepared to go on shore. Geologist hammers, botanizing boxes, nets, and other scientific equipment were brought out, and we all left for land in the motor-boat. On our way we passed a herd of walruses. These were observed from the sloop at the same instant by Captain Eliassen, and as it was the first booty that had been seen since we started everyone's spirits rose. We landed in a little bay and were soon on our way inland. We found the rock to consist of granite and gneiss partly penetrated by pegmatitic intrusions. Gravel and sand lay between the low hills, and a shallow little tarn broke the monotony. A red-brown moss formed a thin covering here and there, but otherwise the vegetation was extremely poor. Here and there lay a few snowdrifts. This stretch of ice-free land on the south-western coast of the island was perhaps three miles long and, in places, a quarter of a mile wide; then it rose evenly towards the glacier, which constituted the mighty background of this shore of a desolate Arctic island. We moved inland towards the glacier and found on the way a little plateau on which a colony of ivory gulls (*Pagophila eburneus*) had its breeding-place. There was a dreadful commotion when we approached and disturbed the idyll. The snow-white birds rose in a cloud, and the air was filled by their hoarse cries. They did not fly far, however, as their young had just been hatched, and so we were able to come very close to them. Towards evening we went on board the *Bratvaag* again.

Apart from the naked tract of land we had just visited, and a similar stretch on its north side, White Island is entirely covered by an immense shield of ice which attains a height of more than 660 feet. From our anchorage it appeared to form a very regular dome. From the south-east, on the other hand—as we afterwards saw—this covering is not quite so symmetrical. There exist several cupolas which, judging from all appearances, give a hint of the underlying topography of the fell.

And then came August 6, a glittering day, with the sun shining in a cloudless heaven. A most intense silence prevailed everywhere, broken only now and then by thunder from the glacier to our north where it sank steeply into the sea. This noise is produced by large masses of ice loosening and plunging into the water, there to continue their existence as floating icebergs until they are melted by the waves. Otherwise, this was the home of the great white silence, and it was not possible to feel otherwise than slightly depressed by the deathly quiet. We were glad to begin our work. Now the sealers began their walrus-hunt, and towards midday two whaling-boats, in charge of the harpooners, Ole Myklebust and Sevrin Skjelten, left the *Bratvaag* to get their booty. The hunt was started just inside our place of anchorage, and no very long time elapsed ere the first walruses were caught and drawn up on shore. While the hunt was going on, the walruses began to retire behind a point of land lying to the south, and the boats pursued them. Skipper Eliassen, in the motor-boat, was busy pulling the carcasses up on land.

As the day went on, the skipper returned to the ship. He approached us calmly and quietly and told us that they had made a great find. *They had found Andrée.* And they had also found the canvas boat of the expedition, filled with all kinds of equipment.

Eliassen had in his hands a book which had lain in the boat. The book was wet and heavy, and the leaves stuck together, but it could be opened in one or two places, and we saw that it was the expedition's observation-book with detailed calculations of the astronomical observations. There was page after page with figures, with here and there a list of the supply of provisions, a bill-of-fare for the week, together with other memoranda. We were astonished to see how neatly and orderly everything was written. It was just as if the notes had been put down in a warm room, and yet the calculations had been made and written during the course of a death-march across the ice. We were aware that Nils Strindberg had been the scientific member of the expedition, so that it must have been he who had made the memoranda. And he must have been a man of the right sort. On the first page we were able to read a part of the title: "The Sledge Journey, 1897." There could be no doubt but that this was the expedition's observation-book used after they had left the balloon, probably far northward in the ice. The news of the discovery made a deep impression on us all. Here on White Island, here where we now stood, was the place where the boldest of all polar expeditions had come to a tragic close. We sat still a moment ere we thought of rising again. Our words were very few, overwhelmed as we were by the discovery that had just been made.

But there was no time to lose. Provided with an iron bar, mattocks, spades, and tarpaulins, we all started for the place where the find had been made, and on the way Eliassen related the circumstances under which it had happened. It was the sealers, Olav Salen and Karl Tusvik, who had first made the find. It is these two young lads who have the honour of being the first to discover Andrée's camp. Salen is from Aalesund, seventeen years of age, and this was his first voyage to the Arctic Sea. Tusvik, from Sykkelven near Aalesund, is twenty-four years old and has had some years' experience of the Arctic regions. Intrepid and able lads, the best types of their calling! It was these two young men whom Fate had chosen to help solve the riddle of the Andrée Expedition, and we were as glad as they at the discovery they had made. They were members of the crew of Sevrin Skjelten's boat. Skjelten is from Haram, near Aalesund, twenty-five years of age; he has been in the Arctic Seas with the *Bratvaag* ever since 1923, as sealer and harpooner. He is an uncommonly capable man with interests and knowledge above those that ordinarily distinguish a sealer. The other members of the crew were Johan Almestad and Sigurd Myklebust.

The story of the discovery was as follows: In the forenoon both whaling-boats had been out killing walrus, and when the animals retired eastward and southward, the boats went after them. Boat number 2 had just shot two walruses which were drawn up on shore to be flayed. When the work had gone on for an hour or so, Salen and Tusvik went up the strand to look for drinking-water to refresh them after their exertions. They came to a stream across which they waded and then, on the other side, they found an aluminum lid, which they picked up with astonishment. They began to look around and noticed a dark object a little farther inland, sticking up out of a snowdrift. They went to it at once and found a canvas boat, half buried in the snow. In the boat lay a number of various articles among which, as seamen, their attention was first attracted by a brass boathook.

The two youths ran back to the beach and told what they had seen, and all the party returned to the spot together. After a short stay they went back to the beach, and then came the motor-boat with Captain Eliassen and Assistant Engineer Ekornaasvaag to help in the work with the walruses. But they found something else to think about. When Eliassen heard of the find he went to the place at once. There lay the boat with a full cargo of expedition equipment, many of the objects being marked "Andrée's Pol. Exp. 1896." About 33 feet north of the boat he found a human body which lay leaning back against the slightly sloping wall of rock. Close by the boat there was a sledge frozen in the ice. Eliassen called to Skjelten and Ekornaasvaag and told them to come to him. They all looked at the find, and on their way back Eliassen went to the canvas boat and took the book which he had brought on board the *Bratvaag*. We learned all this on our way to shore.

We landed on the beach below Andrée's camp, stepping on shore close by a little rock. At some distance lay the two bloody carcasses of the walruses. Some ivory gulls sat pecking at the meat. When we came they flew lazily away but soon returned and continued their meal. We walked up the beach. An end had been put to all hunting, of course, after the discovery had been made, and we could see the sealers standing round the boat that was lying in the snowdrift. We waded across the little stream and went silently towards the camp. Behind us the sea was as calm as glass, and free of ice as far as the eye could reach. Glimmering white icebergs lay aground in the neighbourhood of the island. We approach the camp one by one, without exchanging many words. The excitement is great, for in a few minutes we shall stand by Andrée's last camp.

We are here at the spot! Hither had Andrée and his comrades come, never to leave the place again. The moment was a strange, a solemn one, and some minutes passed before we began our task. We did not speak much—for what had we to say?—and gradually the whole truth broke upon us, the story of the tragedy that had been enacted here. Our thoughts found their way back to that July day in 1897 when the Eagle rose from Dane Island in Spitsbergen with three men in the car, and was carried away by the wind on the most daring polar expedition ever undertaken. The men never came back. The last news from them came by the carrier-pigeon which they had released in latitude 82°, and in their communication there were the words: "All well on board." That was their last message. Everything that happened afterwards had for a generation been the object of the acutest speculations. Search expeditions had sought for the vanished balloonists of whom no trace could ever be found. Andrée and his comrades kept the secret of their disappearance, and gradually the world satisfied itself with the conclusion that the explorers had been lost on the ice or had fallen into the sea, leaving no trace behind them. Most people accepted this explanation. Probably no one ever imagined that Andrée would ever be found. And now here we had Andrée's camp before our eyes and the problem of his disappearance was solved.

It was strange to stand there and let our gaze wander over the same landscape and the same sea that Andrée and Strindberg and Frænkel looked at for the last time thirty-three years before. It was as if we saw them before us. They are coming towards us down there on the ice, pulling their heavy equipment. Tired and weary they must have been when they landed, after having been compelled to leave the balloon on the ice far to the north. We supposed that they must first have endeavoured to make their way to Spitsbergen, but that they had constantly been forced eastwards by the open water. Then, one day, they had caught sight of the icy back of White Island, which we now knew so well. They must have been filled with renewed courage, with fresh hopes. At last they had landed on the barren shore of the island, had felt solid ground beneath their feet, in place of that awful, drifting ice. It was as if the air still gave the echo of their voices. We thought we heard the sledges scrape against the stones when, with a last effort, they pulled them up on the land in order to encamp in the shelter of the rock beside which we now stood. And they must have climbed the glacier now and then to look across the sea—but they could have seen nothing but ice and ocean. Maybe, one day of clear weather, they caught sight of Great Island's white dome in the west. They knew that behind it lay North-East Land, and behind that again Spitsbergen, whence there was the path home to Sweden. . . .

But they were never to leave White Island, for here they fell victims to exhaustion and cold.

The camp lay on the north-west side of a rocky hill. When Andrée and his comrades came there, it must have lain almost naked. Now we saw in front of the fell a large snowdrift, heaped there by the wind. On the snow, some few yards from the naked rock, lay the boat, with its eastern side buried in the snow. It was filled with all possible articles belonging to the expedition equipment, and it was evident that the bears had scattered the contents around.

At the end of the boat nearest the sea lay a parcel of books. We could see nautical and trigonometrical tables, a Swedish scientific work, and evidently many more, which we did not try to open, however, for fear of damaging them in some way. Of the other objects we noticed: two shotguns, an anemometer, aluminum boxes partly squeezed together, string, a work-box with various sewing materials, articles of clothing, and a theodolite. In addition there were a harpoon, hammers, files, a brass boathook, and the bones of a polar bear.

There was much ice in the boat but we could not remove it without damaging the contents, and it was evident that the boat contained much more than we could see. Frozen fast in the ice by the side of the boat lay a furled Swedish flag with the Union mark. Of other objects lying about in the snow we noticed: a square, heavy box which certainly contained ammunition, trousers, a piece of black-and-red cloth, an oblong instrument-box, a barometer; a piece of canvas was found farther off, probably a part of the covering of the boat which had been torn loose by the wind. At about right angles to the boat lay an empty sledge, the upper rail of which was on a level with the surface of the snow, and by the side of which there was found a handkerchief with the monogram N. S. marked with red thread. About 35 feet from the boat and on the naked rock lay the body found by Eliassen. It was frozen and the legs lay in a perfectly natural position. On the feet were Lapp boots, and these lay partly beneath the snow. Higher up, the bones stuck out from among the clothes. Various articles of clothing lay scattered about, and, as there was not much left of the upper part of the body and the head was missing, it was clear that bears had been there destroying and consuming what they could. We opened the jacket carefully and saw that inside, on the back of the garment, there was sewn a large monogram A., from which we drew the conclusion that it was Andrée's remains we had before us. In the right inside-pocket we found a diary, in which, as far as we could see, only a couple of pages were written on. In the same pocket lay a lead pencil and a pedometer.

Not far from Andrée lay a gun, with the barrel sticking into the snow so that only the butt was visible. On top of the clothing there was a Primus stove. We shook it and it proved to contain paraffin still. When we pumped, the paraffin came out of the burner in a fine spray, and the valve at the side was in order, too. We unscrewed it a little and could hear how the gas streamed out. If it had been necessary to cook anything now we might perhaps have been able to use Andrée's thirty-three-year-old Primus. Besides these we saw a cup, cooking-utensils, parts of the cooking apparatus, an axe, and, in a little wooden box, a china pot of lanoline. A little farther off lay a bottle of white tablets. About 60 yards east of this place we found a pelvis, which we considered must be Andrée's.

But several more finds were made. About 38 yards north of the camp Skjelten found a grave lying between two rocks. First he saw a bleached skull which lay there dreadfully smiling among the stones, four yards from the grave. It was a typical Arctic grave.

The corpse had been placed directly on the ground and then covered with stones. The feet in their Lapp boots stuck out between the stones, and, higher up, the left shoulder was visible. Above the stones there was found a shoulder-blade. It was evident that the bears had been busy here, too.

We examined the place around the camp very carefully, but nothing more could be found and so we began to dig the things out from the ice. First we had to excavate the boat, but this proved troublesome work. The ice roundabout was removed by means of mattocks and spades, and, as the work progressed, we found that the boat was resting on a sledge, to which it was well lashed. It had four cigar-shaped cushions as supports. The cushions were wound round with red ribbon. As it would have been too heavy to lift both together, the boat was released first, to do which we were obliged to cut loose the lashings. Then the boat was placed on the snow and we began to work at the sledge underneath, which was entirely embedded in the ice, so that the task of hewing it free was a long one. The empty sledge which lay near the boat was released from the ice with relatively little trouble, and then we directed our care to the human remains.

As I said above, Andrée lay on the rocky ground, so here we met with no difficulties. We stood a long while before this simple resting-place, asking ourselves if it was right to disturb its peace. But finally we were unanimous in thinking that the man who lay there beneath the stones should be carried home to rest in Swedish earth. But it was more difficult to release the remains of the one whom we had assumed to be Strindberg from the initials on his clothes. It was, perhaps, a somewhat bold deduction, but we had got the idea into our heads that it was Strindberg who lay buried there, and our presumption proved correct. First of all we removed the loose stone rubble which covered the dead man. Then it was seen that the remains had no head, and so we thought that the skull which had been found by the side of the grave must be the missing part. Everything below the stones was frozen, and, as the cleft was narrow, we could only work from the two ends, where it was difficult to use our implements. The skeleton was frozen fast to the ground on which it lay so that it had to be hewn free. When we had released it, it was laid on a tarpaulin together with the other bones. The excavation was now as complete as circumstances allowed.

Meanwhile some other members of the party had raised a cairn just behind the spot where Andrée had been found, and on the summit there was placed a pole stayed by means of three guys. It could be seen very clearly and it will make it easy for future expeditions to discover the place. Inside the cairn we placed a bottle containing a sheet of paper on which was written in Norwegian and English: "In this place, the Norwegian Expedition to Franz Joseph Land, on board the *Bratvaag,* Captain Peder Eliassen, found the relics of the Swedish Andrée Expedition. White Island, August 6, 1930, Gunnar Horn."

Everything had now to be carried down to the water. The bodies were placed in tarpaulins and taken first. Then came the turn of the boat. This was not a very easy task, as it was full of ice and very heavy. As has been mentioned, we could not remove the ice without injuring the contents, so we first laid the boat on a tarpaulin for the purpose of pulling it down in that way to the sea, but we had not gone many yards before the tarpaulin began to tear, and we had to give up the attempt. Then we sent down a couple of men to bring up some oars, so as to try and carry the boat with the help of these. We put five oars under the boat and, with five men on each side, we succeeded in lifting the boat and carrying it down to the beach. Everything taken down was afterwards put on board one of the whaling-boats, which became so heavily loaded that its gunwales did not lie many inches above the surface of the water. The load was towed by the motor-boat, and an hour later we had reached the *Bratvaag*. Here the boat and the sledges were placed on the boat-deck to starboard, while the human remains in their tarpaulin coverings were laid on the fore-deck. Later on, Ole Myklebust made a chest, rather more than two yards long, with two compartments. The skeletons were placed in the larger compartment—Andrée with the gun by his side—while in the other were put all the smaller objects that had been found beside Andrée.

It was very fortunate for us that we had such calm weather when we came to White Island, for only in calm weather is it possible to land on the dangerous coast of this island, which is exposed to every wind. If there had been any swell when we arrived at the island, there could have been no thought of landing, and now we had to make such use of our time as to prevent the danger of interruption before we were ready. On our leaving the camp we had an idea that many objects belonging to the expedition might be lying beneath the snow, but at that time the masses of ice were so thick that it was thought better to wait and, on our return journey, call and see if anything had come to the light of day after the melting of the ice which would have taken place by then.

As will be understood from the above remarks, the camp lay somewhat more than 200 yards from the beach and was visible from that spot. But, as a rule, a dark object against a rocky background becomes almost invisible, and it was not until their attention had been awakened by finding a piece of metal on the shore and until they began to search around that Tusvik and Salen caught sight of the boat. We had not noticed any cairn or hut, and if the snow had been a couple of feet higher everything would have been concealed. This summer there had been uncommonly little snow, and the thaw must have been extraordinary. There is, therefore, reason to believe that for many summers the camp has been quite hidden by the snow until on in August. In such a case, even if the island had been examined ever so carefully there would always have been the risk of walking over the boat and the bodies without noticing anything at all. It is worthy of observation that Captain Theodor Grödahl of Tromsö states that he touched at White Island on July 9 this year with the motor-cutter *Hanseat*, that he landed on the south point with two men to look for traces of Nobile's balloon party, and that on that occasion he went over the whole of the point. On the eastern part of the place, he says, there was found, about 100 to 150 yards from the beach, a tin box which was almost destroyed. Close beside it there lay a wooden peg, evidently fashioned by a human hand. There was much snow at the time and only a few patches of land were visible here and there. A little later, he sent five men of the crew ashore to collect eggs and to look for the balloon party, but after four or five hours had elapsed his people came on board again. They had had to flee from the island, for a mass of floe-ice was nearing the land.

We did not stay long at White Island, for the vessel continued its journey the very next day; in the afternoon we had fog again, and White Island disappeared from view. Towards evening the fog lifted and we caught sight of a low ice cupola to port. It was Victoria Island. White Island was also visible, and over and over again our eyes sought the place which for thirty-three years had concealed Andrée and his comrades from an expectant world. At night we reached Victoria Island and ran up northwards along its western side. On the north-west side there was a little beach, the only place where it is possible to land. Here the coast is shelving, as at White Island, and a mass of ice had grounded there. We made our way in, and together with Eliassen and Hanssen I climbed for a moment to the highest point of the island, whence we had a magnificent view. There was open water everywhere. In the south-west lay the bank of fog we had just passed through, and in the west lay White Island, ghostly white in the clear night, with a faint veil of mist around its highest point. It seemed as though it would not let us go but stood there in potent ire, wrathful that we had deprived it of the greatest secret of the Polar Sea.

From Victoria Island we continued eastward, and in the forenoon of August 8, we caught sight of a sealer. We steered down towards the vessel, which proved to be the *Terningen* of Tromsö, Captain Gustav Jensen. He came on board and heard about the find of Andrée's remains, news which, of course, made a great impression on him, for everyone knew Andrée. He had become, so to say, a legend, and in Tromsö people very well remembered the bold Swedes who had intended to make their way to the North Pole by balloon. Jensen was soon going to return home, and we resolved to send by him a communication to the "Norwegian Svalbard and Polar Sea Research," in Oslo, with information of the find. We did this because some time might elapse before we returned. We had important work to carry out on Franz Joseph Land, and the plan we adopted would allow the authorities at home time to make their preparations.

So we left the *Terningen* and set our course eastward towards Franz Joseph Land, our final goal, but which, after our late experiences, seemed to have lost somewhat of its importance. In the afternoon of August 10 we neared land and came up under Cape Grant.

We stayed at Franz Joseph Land until the twenty-sixth, when we returned westwards towards Victoria Island with a faint north-westerly wind and a heavy swell from the south. In the morning the fog grew lighter, and the white dome of Victoria Island was clearly seen against the sky in the west. In the afternoon we passed the island on the south side and at a distance of a couple of miles. The many icebergs we had previously observed at the island were now all gone. It was probably the north-west storm we had lately had which had swept them away. In the evening we saw the icy masses of White Island in the west and, simultaneously, those of Victoria Island to the east. White Island was certainly considerably larger than the other, and its longitudinal direction seemed to run from north-east to south-west. By taking bearings we found its length to be about seventeen miles, and as the breadth is some eight or ten miles, the island is by no means a small one. When we came under its south point we could see, by means of a telescope, the white pole which stood above Andrée's cairn. A bear was walking along the beach and making a good meal, most probably of the remains of the walruses that lay there. We wished we could have gone ashore once more, to see if there was anything more to be found after the considerable thaw which must have taken place during the time we were away. But there was a heavy swell from the south which made landing impossible, nor did it seem as if the sea would very soon become calm again.

We left White Island for good, and set our course for King Charles Land. An hour after we had left White Island the fog grew lighter and we saw the white back of Great Island rise above the horizon in the east, with its contour sharply defined against the strong light which lay above North-East Land. In the forenoon of the twenty-seventh we were off the central island of the King Charles Land group, and after paying a visit to the place we turned our course to Hopen and then to Norway. The first place we intended to call at there was Sör Island, west of Hammerfest. We had now begun to listen a little to our wireless apparatus which we had hitherto not employed very much as, amid the polar summer light, it is not of much service. But now it was later on in the year, and as we came southwards the nights grew darker, of course, so that we could once more hear the news which was being broadcasted. On the twenty-ninth we had a storm from the south-west and were obliged to lie to and back, the sea being so heavy that it was no use trying to force the vessel through the waves. As on previous occasions, the *Bratvaag* showed herself to be absolutely seaworthy. She rode the billows like a bird and did not ship much water. A magnificent vessel, with an equally good engine. Nothing was ever out of order.

In the evening the wind fell a little, and we began to put on speed again. On the morning of the thirtieth we were abreast of Björn Island, and later on in the day the wind dropped still more, although the swell continued to be very heavy. In the evening we were about 120 miles north of Sör Island, and then we put our radio into operation. There was news of all sorts to be heard, and many good sending-stations, so we passed the time very agreeably and were happy that we had come so far south again that, by means of our "wireless," we were once more able to get into communication, so to say, with mankind. A little past nine in the evening Sörensen sat listening to the weather reports. Then, all of a sudden, he heard: "Hello, *Bratvaag!*" He came rushing up on deck and said that they were calling us and asking us to come home. We all tumbled down the companionway into the cabin and heard the communication when it was sent out the second time. The call acted on us like a bomb. *Now* we began to understand the degree to which the world must have been moved by the communication respecting the Andrée-find which we had sent home by the *Terningen*. Then came Sunday, August 31. We had got land in sight during the night and were under Sör Island in the morning. At eight o'clock we hailed a fishing-vessel to exchange bear's-meat for fresh fish, and then we heard that a number of vessels were looking for us. We went into a little place, Hasvik, on Sör Island, in order to telephone and wire, and so for the first time came into actual contact with a world which seemed to be a trifle excited. From Hasvik we continued to Skjærvö, where we anchored in the evening, and Eliassen and I at once went up to the telegraph station to dispatch several messages. The whole world seemed to be in communication with Skjærvö, whose name had once before flown over the globe, namely, on the return of the *Fram* in 1896. There were journalists everywhere and we were greatly impressed by the rapidity with which everyone had found his way to the place. We were met with amiability and good humour on all hands, but we none the less thought that our reception was almost too great. Still, we consoled ourselves with the Arabian proverb written on the cabin wall of the Austro-Hungarian polar vessel, the *Tegetthoff*, which read: "This, too, will pass!"

At Skjærvö we received orders to leave, so that we could arrive at Tromsö on the morning of September 2, and we were informed that a vessel of the Norwegian Navy, the *Michael Sars*, would meet the *Bratvaag* in the channel between Skjærvö and Tromsö. We left Skjærvö in the afternoon and, early in the morning of September 2, met the *Michael Sars* at Grötnes. On board was the Commission appointed by the Swedish and Norwegian Governments to receive and preserve the find. They came on board the *Bratvaag* and we gave them all the information we could respecting the matter.

We arrived at Tromsö at 8.30, and then the members of the Commission went on board the *Michael Sars* again. At ten o'clock we went to Consul Arnesen's quay, where the bodies were borne on shore amid great solemnity and with a guard of honour from the *Michael Sars*. A little later we moved up to the quay below the Tromsö Coast Hospital, to which the remains had been carried. All the objects found by us were now transported to the Hospital, where the members of the Commission at once began their labours.

In memorial lines written long before on Andrée are the words:

"No memorial can be raised above the grave of Andrée and his comrades. And the spot where it should be raised will, perhaps, remain for ever unknown."

A casual incident, a happy contingency, enabled us to discover Andrée and his comrades, and to raise a simple cairn of stones above their last camping-place on White Island. We are all glad and proud that it was just we whom Fate had chosen as the instruments of solving one of the greatest mysteries of polar exploration, and of bringing back the polar travellers to rest in the soil of their native land.

XII

The ISBJÖRN *Expedition to White Island*

By KNUT STUBBENDORFF

IT was a woman who first had the idea which was realized in the *Isbjörn* Expedition to White Island. Mrs. Elsa Nyblom's idea came at the right moment for, of course, all the chief editors of all the newspapers in the world felt the same longing on August 23—to procure news respecting the Andrée find. And Fate arranged matters so that this lady's proposal initiated the sequence of well-connected events which led to the *Isbjörn's* completion of the work and findings of the *Bratvaag*.

The journey from Stockholm is begun by the Lapland Express, and on the way I send a wire:

"Is it certain that the *Isbjörn* can start immediately?"

When we have almost reached Boden the answer comes:

"The *Isbjörn* clear to start Tuesday twenty-six *Isbjörn* best wireless strongest engines telegraph agreement express."

But I did not, being wise from old experience. But in Narvik I was met by a serious gentleman who had charge of everything.

"Now there is no other boat free but the *Isbjörn*. The owners demand agreement wired express. An American syndicate is your rival."

I was not as yet aware who the "we" of Stockholm were! I possessed nothing but Mrs. Nyblom's idea and the remainder of the $150 which she had quickly scraped together as my starting capital. In any case, a decision was called for. The *Isbjörn* was engaged.

If one reaches Narvik in the morning—which is usually the case when one comes from Stockholm—one must usually wait until the evening to be able to go on to Tromsö by the ordinary express-route steamer. But journalists and their like have discovered that it is possible to take a motor-car across the fells and catch the express boat of the evening before, at Finsnäs. This is a wonderful ninety-mile trip, and we made it. In this way we saved twenty-four hours of valuable time and arrived at Tromsö on Monday evening, the twenty-fifth.

The next morning, then, the *Isbjörn* was to start.

The owner was a pleasant fellow, jolly, agreeable, and a man of the world. He had awakened my interest in the *Isbjörn*; he had made me hope that in it I should be the first to start from Tromsö; he had made me feel sure that I had hired the strongest, swiftest sloop, with the best wireless on board and—the *Isbjörn* was not to be seen at Tromsö!

My task was to go out from Tromsö with an Arctic sealer, and meet the *Bratvaag* in the Polar Sea; to go on board and to interview Dr. Gunnar Horn.

A very simple plan in itself, of course, but difficult to carry out.

Early in the morning of Tuesday, August 26, I left my hotel room. In the silent and empty harbour, which smelt of dew and fish, I engaged a man and a rowboat; I was freighted across the sound and landed on the side where Gustav Jensen dwelt. It was in Tromsdalen, which, at that moment, was a miraculous, sun-illumined, autumn morning idyll, lying between the slate-black walls of the fell.

Gustav Jensen was the skipper of the good sloop *Terningen* and he had been on board the *Bratvaag*, up there north of 80° latitude. He was the first and, till now, the only person who could tell the civilized world what Dr. Horn had related. He had Horn's letter to the Svalbard Office, he had seen what was on board the *Bratvaag*. And he could speak about things from personal knowledge.

Gustav Jensen was a man of forty, pleasant and profound. He was the boldest relator of sailors' yarns I have ever met.

This morning, his imagination had carried him so far that he could calmly assure me he had recognized Andrée, where he lay frozen in clearest ice on board the *Bratvaag*.

It is possible that he had been inspired to this romantic excess by what had been said by some expert in the columns of a newspaper as regards the remarkable preservative qualities of ice. And the expert, in his turn, may possibly have read a creepy novel by Hanns Heinz Ewers.

While breakfasting on my return to town, I met the owner of the *Isbjörn,* who informed me that he would go out in his motor-boat to meet his sloop, and arrange everything on board for a speedy start not later than the following morning, that is, Wednesday forenoon. I could do nothing but urge him to make all possible haste, tied as I was to the *Isbjörn,* as no other sloop with wireless could now be had.

When my friend the ship-owner had gone, I went to Consul Karl Sæter, the representative in Tromsö of the Svalbard Office. I asked him if he thought that there was really anything on board the *Bratvaag,* and begged for his opinion on Captain Gustav Jensen.

Consul Sæter gave me an amiable but ambiguous reply, stating that he could say nothing positive with regard to the find. What Gustav Jensen said, Gustav Jensen had to be responsible for.

Thus invited to draw my own conclusions, I realized that the task I had been given in Stockholm, to go out and meet the *Bratvaag,* would be insufficient. It was too uncertain.

While I was still at Narvik, an acquaintance had asked if I did not intend to go direct to White Island. At Tromsö, on Monday evening and during the night, we had discussed the matter, but the insight that this was the only reasonable thing to do had not become clear to me before now, Tuesday morning.

A telephone-call from Stockholm supplied me with important information, namely, the names of the persons and of the newspapers for whom I was working. Captain Sten Dehlgren, the chief of the *Dagens Nyheter,* asked if I had not time to go up to White Island, to which I replied that that was part of my plan. And so our agreement was settled.

Tuesday, August 26, was an unpleasant day. The *Isbjörn,* my sloop, had not returned to Tromsö after its last sealing-trip. Nor had the owner of the *Isbjörn* returned, and I myself began to feel some doubts as to the possibility of starting. And then, it was raining.

A group of my colleagues, happy and expectant, went on board the sloop *Heimen* with Captain Gustav Jensen as pilot, at nine o'clock in the evening. Late that night I received the message from a friend who had gone as look-out, that the *Isbjörn* had at last come in.

The following afternoon the unloading of the boat's cargo was stopped and, with one-half of a six months' catch on board, the *Isbjörn* set out to meet the *Bratvaag,* and to continue to White Island. While we were going at half-speed through Fuglöy Sound on Wednesday night, and were trying to repair the damaged wireless apparatus, the little *Heimland,* the third journalist boat, came out of Tromsö and sailed past us at a good speed on its way northwards towards the Polar Sea. The *Isbjörn* was last in the race.

I was unsuccessful in my attempt to meet the *Bratvaag.*

But, thanks to a wonderful chain of events most favourable to the *Isbjörn* Expedition, we were the only ones who made the attempt to go on to White Island, and thanks to the crew, who understood that something extraordinary was demanded of them, we reached our goal in spite of an engine breaking down and a few other mishaps.

For my own part, I was fairly convinced that there was not much left to be done on White Island, for I listened every day to the broadcasted account of the work of the scientific Commission. The Commission had just begun to examine *those remains of Strindberg and of Andrée* which the *Bratvaag* had brought home, and its labours had not progressed so far but that a hope was still entertained of discovering a *third body* in the canvas boat.

After the canvas boat had proved not to contain any remains of a third man, rumour stated that no more than two men, that is, Andrée and Strindberg, had landed on White Island and died there. It was the discoveries made by the press expedition on board the *Isbjörn* which was to establish the fact that all three men—Frænkel included—had been at White Island.

The sloop arrived at White Island on the morning of September 5, and we went ashore seven men strong, met polar bears on the tundra, shot three of them, and found the cairn which Horn had raised by Andrée's camp.

Hitherto my undertaking had been a bit of sport, an agreeable adventure, a change, accepted with pleasure, in the everyday life of a writer. But at White Island I encountered a responsibility which, as an experience, was perfectly new and unthought of. In its presence I am humbly conscious of the equivocal appearance of my role there.

Perhaps I was unworthy of that role. But I was not *more* unworthy than any other person would have been who came to this camping-place of the dead for the purpose of bringing back their remains to an impatiently waiting world. No one could have felt more deeply than I, that moment on White Island, his own littleness and the greatness of his responsibility—whether his wish to disturb the silence of this desolate island had been prompted by scientific or by journalistic craving for knowledge, whether he had desired to ensure the advantages of the undertaking to a scientific institution or to a newspaper concern. While executing our uncouth work at that place, even though in the fulfilment of a duty, we should all have felt equally unworthy.

On the stony tundra, with its sandy-bordered, dried-up streams from the inland glacier, there rose a little rocky ridge, sixteen to twenty feet above the level of the ground. On top of this rock stood a cairn, from the summit of which there projected a guyed pole with a cross-piece. The little rocky ridge ran east and west, and lay about 250 yards from the edge of the water, about 1100 yards from the edge of the inland ice, and approximately the same distance north of the place where the jokul-fracture of the glacier dropped steeply to the sea.

We came to it from the north. In front of the rock, and up to the spot where we had stayed our steps, there lay an even surface of ice, extending some thirty paces in the longitudinal direction of the rock, and thirty paces broad in a north and south direction. It was disintegrated ice, with thawed patches; it was a crust of ice in the process of melting, so that its thin outermost edges, which rested on the tundra, were as soft as old, wet snow. Various objects and fragments of bones could be seen in the uppermost layer of the ice.

At that end of the ice-crust which lay towards the land stood two half-scattered heaps of driftwood sticks, one of them resting against a loose block of stone, the other against the rocky ridge itself. At the opposite end of the ice-crust there was a broad bed of sand and round, water-sluiced stones.

There lay a sledge, with clothes and fragments of articles strewn around, just as they had been left when the ice had melted and the water run off. The discovery of these objects in this desert place, these lifeless things, which swiftly carried the thoughts to their former owners and the uses to which they had been put, gave birth to an irresistible impression of the opposition between life and death. Here, then, had men, warm-blooded and with a will to live, been compelled to cross the threshold of the kingdom of omnipotent cold! They had lived here—and perished.

I wanted to know: how? I wanted so much to speak about, to describe, that white, cold desolation lying above and around the inland ice, to draw the emptiness of the tundra, and on this very spot to try to paint a picture of man's defiant and tenacious struggle for life.

But to examine the scene for that purpose, I should be obliged, with the self-assumed right of the investigator, to commit profanation. And such sacrilege implies a responsibility much greater than that laid upon me by my task as a journalist.

We photographed the place. Then we walked on to investigate further, but not before we had agreed that nothing was to be lifted or removed before I had determined what was to be done.

At some distance on the ice, not far from the rock and just where the cairn stood, I discovered a backbone, a pelvis, and one thigh-bone of a human being. Not long afterwards, there was found a shoulder-blade close to the same place. Then, at once, immediately below, a skeleton consisting of a whole bone, a thigh-bone, a knee-bone, and a foot. A little while later we found a bone of an upper arm, with rags of a striped shirt around it. Still later on, when we had been some hours at the place, there was seen dimly through the ice, and close to a piece of driftwood, a human skull.

We did the work in this way. First, we gathered everything that was lying loose, and after I had noted down the principal of these, I began to think I could distinguish a certain planning of the camping-place, to wit, a cache or depôt at the edge of the ice-crust nearest the sea, just where the sledge had stood, and then a dwelling-place close to the north side of the rock and near the spot where we had found the backbone and the pelvis. Then we began an organized hewing and picking away of the ice lying around the finds at these two places.

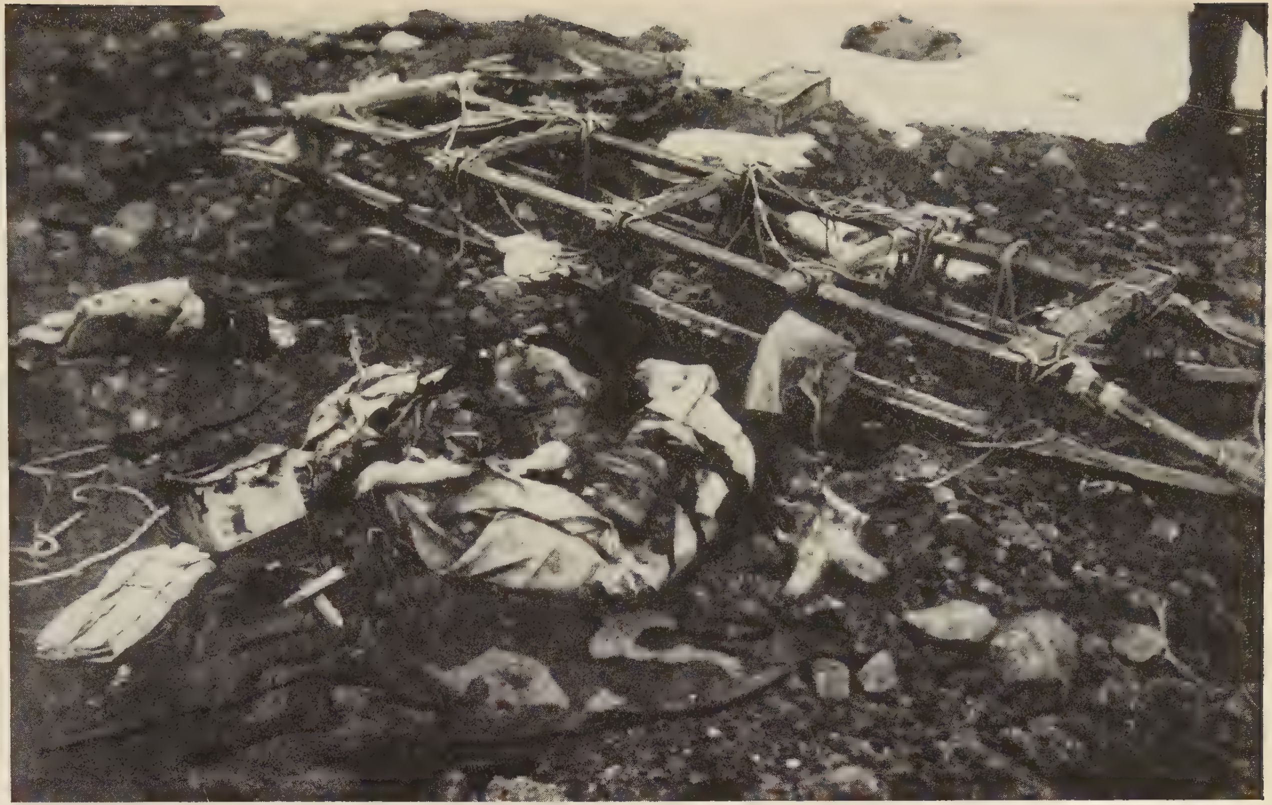
It began to dawn on me that the brief reports issued by the Commissioners, and the free deductions drawn by the papers on the basis of these communications, had created an altogether erroneous idea of what had already been found and of what might possibly remain to be discovered. But after the discovery, on this first day, of the parts of an almost entire skeleton, I did not believe there were many more human remains left. The next day, however, an iron bar, which we were using against the side of the rock to reach what we took to be some thawed-out rags of reindeer skin, struck against something with an arresting sound. I cried out to stop the work for a moment, and placed myself with my face to the ground the better to see, and to sweep clean what lay between the flakes of ice and the ice-water.

That day—the second of our stay at White Island—was devoted almost entirely to getting clear this find, which proved to be the head and upper body of a man lying on his left side, his left arm bent upwards, with the hand beneath the head.

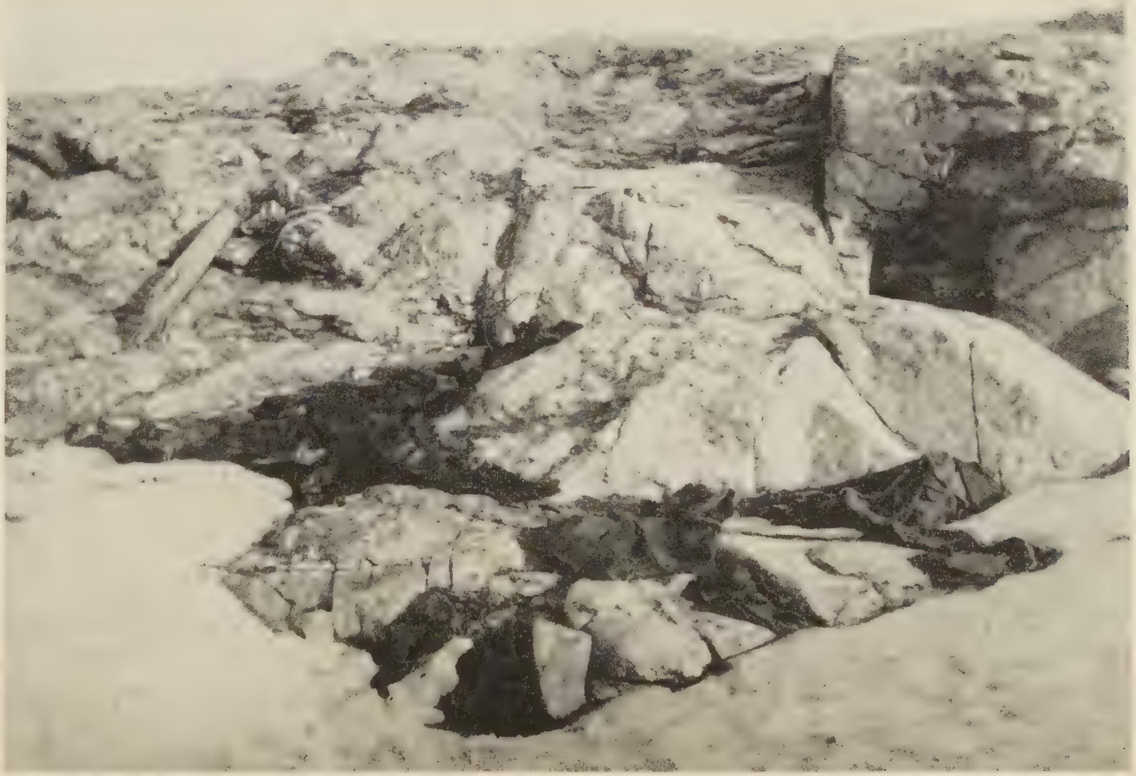
The dead man was frozen fast to the ground, and I gained the impression that he had lain undisturbed, imbedded in the ice deep below the surface, ever since death had touched him. The head rested in a bowl-like depression in the rock, and was frozen fast to it. During the process of liberating both the body and the head without breaking any part, I was obliged to make my way with a clasp-knife into the narrow, ice-filled space between the skull and the rock. We finally succeeded in lifting the body with the head still attached, and placing both in a basket, which we afterwards carried down to the boat and across the fiord to the *Isbjörn*.

When a coffin had been made, and we transferred the remains into it from the basket, the only way I could place the body was with the head resting against the side of the coffin. A little later, however, the head broke off.

On the first day of our stay at White Island—September 5—we had found: the sledge; a large bundle of balloon-cloth or tarpaulin containing clothing; two pairs of snowshoes; a sextant; a medicine-chest; a canvas bag with geological samples in copper boxes; tin boxes with films; two boxes of ammunition; oars; and fragments of the canvas boat. In addition, we discovered Frænkel's almanac and three memorandum books, Strindberg's logbook, and a number of other objects, which we could not examine before we went on board again. On the first day, too, we had also found the parts of skeletons already enumerated.



REMNANTS OF THE CAMP, SHOWING ONE OF THE SLEDGES



ANDRÉE'S LAST RESTING-PLACE ON WHITE ISLAND

On the second day we found the aforementioned upper part and head of a man, and, besides this, a sheet-iron box containing provisions which had not been touched, some small unopened tin boxes, a meteorological journal, Strindberg's almanac-diary, and a few other articles and documents of less importance. During the evening of the second day, we had hewn free the ground-plan of Andrée's dwelling and found its external limits. The hut may possibly have been a tent, with a framework of driftwood sticks and the bone of a whale, and have been raised against the north side of the rock. When we uncovered the ground where the tent had stood, the floor was bounded to the south by the rock, to the west by a whale-bone, and, on the other two sides, by sticks of driftwood. When we left the place on Saturday evening, September 6, to go out to the *Isbjörn* again, we could not find any other articles there.

On the third day—Sunday, September 7—the weather was raw and threatening, with sudden squalls of wind, fog rising and lightening, rain and snow alternately. We went ashore to take measurements. After working about three hours on the tundra around Andrée's camp, one of us discovered that a storm-signal had been hoisted on board the *Isbjörn,* which lay drifting amid the ice a mile or two from shore. The northerly wind threatened to enclose the vessel in the floe-ice, and the risk was the greater in that the engines were damaged.

Before leaving the island for the last time, I paid one more visit to the camping-place of Andrée's men. I then found at the end of the ice-crust towards the sea, and at the spot where the depôt had been, a pair of perfectly whole snow-shoes, which had emerged from the ice since the previous day. This was our last find at White Island. Once on board again, I gave orders to head for home.

Now followed the attempts to prepare, to preserve, to make something of the finds, in addition to the steps which had already been taken to this end on the island. The objects were made free from ice as far as was possible, and then they were placed in the hold. The frozen books, lumps of paper, and the letters were allowed to thaw in the open air, until, without damaging them further, I was able to get them loose from whatever they happened to be stuck fast to—fragments of clothing, etc. Then I kept them in my cabin, which became a trifle uninhabitable, chiefly on account of the smell, and the rolling of the sloop, too, made it a somewhat uneasy workroom.

With regard to these documents, I had a double task to perform. First of all, I had to study them in order to discover something that might benefit my journalistic errand. And then I was thoroughly conscious that I could not allow them to be ruined. And when I took steps to try to save them from destruction, I was, of course, quite conscious of the risk I ran.

So I considered matters as carefully as I could, and was in suspense as to what I should do, having no technical knowledge of the work. But after some experiments and a little thought, I discovered that the work of preparation was scarcely such a mystery as—with the respect that a layman is bound to pay to the opinions of experts—I had been afraid it was.

When the maps of frozen paper had thawed, evaporation, of course, began, and on studying the progress of this phase, I discovered that, at a certain stage, the leaves of the paper were both firm and soft enough to remain entire while being drawn apart. I pushed a knife cautiously between the edges, which were partially destroyed and stuck together, until the leaves could be separated fairly easily—easily, at least, in comparison with the difficulty I had imagined. The first document to which I devoted by meddling attention was Strindberg's logbook, at which I worked for more than twenty-four hours without sleeping. By the end of this time I had gained a certain experience, and my cabin was full of sheets of paper. For, in order to take a radical step to prevent the leaves sticking together again while they were drying, I had separated them entirely from each other, placing each on coarse paper. I noticed almost immediately that, if I allowed the drying process to go beyond a certain stage before I separated the leaves, it was difficult to get them apart again, while if they were allowed to dry altogether they stuck together as if cemented.

For this reason, and as my cabin, with its berth, shelves, chest of drawers, and seat, could not shelter more than a certain amount of leaves, I interrupted the evaporation of the books and documents that remained by wrapping them in ordinary white waste-paper and placing them together in parcels. In this way they remained moist until their turn came. I imagine that it was thanks to this method of procedure that I was able to separate every leaf of the documents at which I worked, and that it is thanks to this system that I was able to prepare the two chart-sketches of the journey of the men by balloon and across the drifting ice—documents which I did not find before we were a couple of days on our way home.

Both these charts appear to have been drawn by Strindberg, and both were hidden in those parts of the memorandum-books which, at first, I thought contained no writing and were, therefore, valueless. But I had kept them in the way just described, in order to examine them thoroughly later on.

The first map-sketch lay at the end of Strindberg's logbook, a long way from the place where the notes ended; the second chart lay in the unwritten part of the meteorological journal.

During my work on the documents which concerned the Andrée Expedition as such, I no longer felt that sense of responsibility, in respect to the personal belongings of other people, which I had experienced while I was excavating on the island, and also during the first few days on board on the return journey. It was an exciting undertaking, arousing the imagination to an indescribable degree, to endeavour to read, from the documents written a generation ago, the fragment of history which the fate of the Andrée Expedition at all events is.

I have seldom, if ever, experienced a more dramatic, a more touching succession of events than when I began the preparation of the wet leaves, thin as silk, and watched how the writing or drawing, at first invisible, gradually became discernible as the material dried, giving me a whole, connected description written by the dead—a description which displayed unexpected and amazing details, and which allowed me to follow the journey of the balloon across the ice during the three short days from July 11 to 14, 1897; which showed me the capricious and cruel sport of the drifting ice and the endeavours made by the three men to reach land, during the months that followed, until September 17, when White Island was discovered, and on till October 2, when the ice-floe broke beneath the snow-hut.

And this brought me face to face with the living men! Their private correspondence lay unread and well preserved in my boxes. Here, in the short memoranda of the journey, they display themselves in full—as human beings and as men!

They showed me a picture of courage undismayed even before the impossible!

During these studies of the documents and the classification of the finds, which were carried out as well as circumstances permitted, the rolling sloop made its way back to Norway. Isolated from the outside world, I was given only fragmentary glimpses of information respecting the opposing interests which had been brought into life by the telegraphic accounts of the *Isbjörn* Expedition. Thanks to this expedition, which had been organized and sent out by newspapers, it was possible, of course, for the eagerly expectant public to obtain, at a comparatively early stage, a picture of the most important outlines of the events which had taken place in the far north during the summer and autumn of 1897. I may be forgiven if I considered the attempts made to obstruct my accounts—written with a feeling of personal responsibility to the dead—as mistaken interference in the self-evident duty of a journalist to carry out his work.

It was my hope to hand over to the Commission at Tromsö, in good order, the finds made by the *Isbjörn* Expedition. For this reason I determined to allow the vessel to lie to, as soon as we were in quiet waters in some northern Norwegian fiord, and there, free from the interruptions caused by the constant rolling at sea, to go very carefully through everything and draw up a reliable and detailed report of the find. On Monday, September 15, we had just come to a place where this plan could be put into execution, and I had already begun the work, when I was reached by an order to return immediately and place everything as it was in the hands of the Commission, which was impatiently waiting at Tromsö for my return. The next day, Tuesday, the sixteenth of September, the *Isbjörn* Expedition was met just north of Tromsö by the *Svensksund* and the *Michael Sars,* both of which lowered their flags to half-mast and then acted as our convoy. Our sloop made fast in a bitter rain to Nemak's pier, just south of Tromsö; the men-of-war's men lined the decks, and the coffin with the dead was carried ashore with military honours by four of the *Isbjörn's* crew, and placed in the hearse. Everyone from the *Isbjörn* walked immediately behind the coffin up to the Coast Hospital. After the coffin had been left here I was requested by the Commission to give an immediate account of my undertakings in the north, and to place all the finds in their hands. This was done within the course of some few hours.

When I had telegraphed from the *Isbjörn* all I was allowed to telegraph—and what my loyalty towards the dead permitted—and when we of the *Isbjörn* had placed the dead and their possessions in charge of the Government Commissioners, the expedition of the *Isbjörn* to White Island was ended.

The *Bratvaag* had shown the *Isbjörn* the way. Chance permitted the sealers of the *Bratvaag* to make the first discovery, and the organization of the press of today, assisted by the splendid crew of the *Isbjörn,* completed the task of throwing light—to the extent that was at all possible—on the fate of Andrée's men.

XIII

The Camp on White Island and Its Equipment

By Prof. Nils Lithberg

White Island forms the easternmost edge of that island-world which is designated by the name of Svalbard.[1] According to information given by Peder Eliassen, captain of the *Bratvaag,* practically the whole island is covered by an ice-cap, the height of which is 650 to 950 feet above sea-level. Only in two places can naked ground be seen: one of these lies on the north-east side of the island, the other on the south-western corner. The naked earth at the latter point extends along the coast for a distance of several miles. It rises from the shore to a height of 130 to 160 feet above sea-level, where it meets the ice-cap. The breadth of the island varies. At the spot where Andrée's camp was found it is a mile or so across; from about the middle of the naked stretch of land a point projects into the sea. The ground consists partly of solid rock, covered here and there with blocks of stone, and partly of sand and gravel. On the level part there rise a few low mounds of rock. At the time of the *Bratvaag's* visit on August 5–6, caps of snow or ice were to be found here in a few places. There was just such a crust of ice at Andrée's camp. It lay in the shelter of a shelf of rock which rose about 10 feet above the ground below; in form it was round with a few projecting tongues. Its diameter was about 125–175 feet. Its greatest thickness then was probably about 6½ feet, thinning off towards the edges. The surface consisted of a layer of ice-sludge about one inch thick, but the mass formed one hard, opaque sheet of ice.

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[1] The ancient and now resumed Norwegian name of the Spitsbergen group of islands. —*Trans.*

This shore is everywhere low, so that it is possible to land on almost any point of it. Immediately below the camp-site the landing facilities are especially good. At one spot there is a little bay where a boat could land. Here the edge of the rock runs down to the shore, and close to the bay lies a piece of solid rock which rises about a yard above the surface of the water, with a perpendicular face towards the sea. Here the water is about a yard deep. Eastward of the bay, too, there is a similar piece of solid rock, and in these two places it is an easy matter to make fast to the rock and carry things ashore.

That the Andrée camp was discovered just in the summer of 1930 was undoubtedly due chiefly to the prevailing favourable climatic conditions. The melting of the snow seems to have been greater than for many years past, while at the same time the opportunities for hunting and sealing have been richer here than in many other places in the Polar Sea. It was indeed while engaged in walrus-hunting that the *Bratvaag* came upon Andrée's camp on August 6. But it is significant of the situation that, as we now know, one ship at least had landed on the island earlier in the summer and had even found objects belonging to Andrée's camp. A Captain Theodor Grödahl of Tromsö had visited the place with his ship *Hanseat*, and strangely enough, the object of his visit had been precisely to find the relics of a polar expedition, not of Andrée's, but of Nobile's balloon party.

On July 9, at 3 p.m., Captain Grödahl landed with two men on the south-west point of the island, the only visible part that was not covered with ice. According to Captain Grödahl, this space extended for about 3 miles along the shore, and its breadth, from the shore to the inland-ice, was estimated at four to five hundred yards. They searched the whole of the space between the shore and the edge of the ice-cap, and on a point north-east of the landing-place there was found, at a distance of 100–150 yards from the shore, i.e., just where Andrée's camp was afterwards discovered, a sheet-iron box almost completely destroyed by rust, and by the side of it lay a peg, about eight inches long, evidently formed by human hands. Here, too, there also lay a lot of driftwood which it was evident had not been thrown up so far by the sea, but must have been carried there. Over this space there still lay a lot of snow, with, here and there, naked patches, and on some of these ivory gulls and other birds were breeding. "At 7.30 p.m." relates Grödahl, "we went on board again, and then I sent five other men of the crew on shore to look for eggs and, if possible, to find some remains of Nobile's balloon party. I never thought a minute of Andrée; when he went on his expedition I was quite young. Had I found anything of what has now been discovered, I should certainly have remembered him. After four or five hours my people came on board again, and we were obliged to leave the island in a hurry for there was a lot of pack-ice there."

The next day the *Hanseat* met the *Terningen*, Captain Jensen, and mentioned that they had found on White Island some objects showing man's handiwork. In the middle of August the two vessels met again; Captain Jensen, on the *Terningen,* was now able to inform the other captain that he had met the *Bratvaag* and had learned that this vessel had discovered Andrée's camp. When this meeting took place, Captain Jensen was on his way to Tromsö from the Polar Sea with the news which was, later on, to gain for him a doubtful international reputation in consequence of the exaggerations in his account. We gain the impression that, despite everything, the Polar Sea is not so very large. The many small sealers meet and converse with each other, and gossip is as lively as if they had met in the streets at home in Tromsö.

On September 5 the *Isbjörn* arrived at the island in order to examine the site of Andrée's camp, but another ship already lay there, the *Hakon* of Tromsö, which had been there for two days but, because of bad weather, without success in landing a party. Just as the *Isbjörn* arrived, however, the *Hakon* had caught sight of a herd of some twenty walruses, and this became the object of such interest that both the *Isbjörn* and White Island were forgotten. A little later, the crew of the *Isbjörn* thought they observed a second vessel, but some of the men said it was only dirty ice, and no new vessel ever became visible. The *Isbjörn* left White Island on September 8. According to statements in the newspapers, another vessel visited the place later on. On that occasion the ice had completely disappeared but the only things seen were the remains of a basket, clearly one of the baskets which had been found when the *Isbjörn* made its visit. It was in such a ruined condition, however, that it was not brought home.

Hence, it may be said with a tolerable degree of certainty that extremely few, if any, remains of the Andrée Expedition's equipment are still to be found on White Island. In other words, we are morally sure that we now have practically all the material obtainable from which to form a picture of the situation at the time when the expedition perished.

The *Bratvaag's* finds were made in three different places[1]: 1. the boat and a sledge lying at an angle to it (A1 and A2 on the plan); 2. Andrée's body (B1 on the plan); 3. Strindberg's grave (E1 on the plan). Besides this, driftwood had been seen sticking up out of the ice at one place. The *Isbjörn's* finds were made chiefly in two places: 1. a sledge somewhat to the left of the boat (A3 on the plan), and around it a number of articles belonging to the equipment; 2. a square (B on the plan) bounded to the left by a bone of a whale, to the north and east by a stump of driftwood, and, to the south, by the same gradually sloping wall of rock close to which Andrée's remains had been found. In addition, there were found in two places (D on the plan) heaps of driftwood logs, one of which had already been observed on the visit of the *Bratvaag*. The principal find within the square B was Frænkel's skeleton (B8 on the plan). On comparing, at Tromsö, in the presence of representatives of the two expeditions, the plan-sketches made on the visits of the *Bratvaag* and the *Isbjörn*, it was discovered that the boat and the sledge found by the *Bratvaag*, together with the sledge discovered by the *Isbjörn*, formed one find-complex. A second find-complex was formed by the remains of Andrée, discovered by the *Bratvaag*, and Frænkel's skeleton with the square construction around it, discovered by the *Isbjörn*.

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[1] Cf. the plan of the camp and its equipment.

Knut Stubbendorff, the leader of the *Isbjörn* expedition, had christened the former place the "depôt," and the latter, the "hut." As we shall see later on, however, the denomination "depôt" is somewhat misleading. One should rather employ the term "parking-place for the sledges." The term "hut," too, is not quite satisfactory, as one naturally thinks of a house with walls. There cannot have been any such erection here. The two driftwood logs and the whale-bone, lying like sides of a square, point rather to the presence of a tent, on the skirt of which the relics now found had been placed to hold the tentcloth fast. In the following remarks we shall call the first place "the open camp around the sledges," and for the second we shall employ the more neutral expression "the dwelling."

The camp-site lay about 650 feet from the shore, and the height above sea-level was estimated at about 30 feet. Near the south-east side ran a rocky border which rose in ledges up towards the place where Dr. Horn afterwards raised a cairn. The base of the cairn is about 30 feet above the level spot below. It was against this edge of rock that the ice-cap mentioned above had been deposited. This covering, which, on the visit of the *Bratvaag* still had a diameter of 125–175 feet, with a greatest depth of about 6½ feet, had, when the *Isbjörn* arrived, melted to such a degree that its length in a south-east direction was about 100 feet and its breadth from west to east about 30 feet. Its greatest depth then was estimated as being a little less than two feet, a thickness found a little way below the edge of rock.

The first object found at the open camping-place around the sledges was the canvas boat. It lay in a north and south position.

When it was being hewn free of the ice, it was discovered that, below it, there was a sledge to which it was still tied fast in a few places. The sledge lay with its head towards the north. The northern end of the boat, therefore, can be termed the bow and the southern end the stern. The boat lay obliquely in the ice so that the starboard rail was on a level with the edge of the ice, and the port rail was sticking up above it. This is probably the reason that the port rail is now so badly injured, as it has probably been trampled down by bears in former years. The sledge below the boat was standing on the naked ground, so that, when it was being released from the ice, large stones accompanied it from the solid foundation. About six yards to the west of the boat another sledge was found when the *Bratvaag* came to the place. The upper edge of this sledge was lying perfectly plane with the ice, and below it there was a layer of hard, so-called blue ice, from 12–16 inches thick. This sledge stood with its head to the west. Excepting the few articles of clothing—stockings, among other things—that were lying on it, it was empty. In the neighbourhood of the sledge there were also found other articles frozen in the ice, but not so deep that they could not be seen. Among these objects there may be mentioned a Swedish flag with the mark of Union, a box of ammunition, a handkerchief marked N. S., etc. Down by the runners, too, a pair of stockings were found which had never been used. No finds were made deeper down in the ice, however.

These observations must possess a certain importance if we try to form a picture of the natural conditions prevailing at the time when the objects were carried to the spot. The bed of ice on which the empty sledge stood cannot, of course, have been formed after the sledge was drawn there. The second sledge standing on naked ground may, on the other hand, be the result of its having sunk deeper into the snow at a time of thaw than the empty sledge, since it carried the heavy boat. Then too, the boat, with its metal fittings and its contents, absorbed more heat, whereby the snow or ice about and beneath it melted more rapidly. It is true that, immediately to the west, close to the stern of the boat, there was found a psychrometer box standing upright in the ice, about a yard above the ground, but no importance can be attached to this, for it may have been pulled out of the boat by some animal on a later occasion. It would seem, therefore, that we are justified in supposing that, when Andrée and his comrades left their belongings here, the place was covered by a crust of ice as it was when the *Bratvaag* visited it. How thick this cap was in October 1897 can, of course, never be settled; during the many summers that have passed since then, the ice may have melted considerably. But as it still amounted to at least 20 inches beneath the empty sledge last summer, the thickness of the ice can hardly have been less when the sledge was deposited there.

The *Bratvaag's* find of only two sledges was perplexing. From the memoranda of the journey over the ice it was known with certainty that each man had drawn his own sledge. The riddle was solved by the *Isbjörn* when, about 23 feet south-west of the boat, there was encountered the third sledge standing with its head in a south-east direction. This sledge stood on the naked earth, but this might have been the result of the almost complete melting away of the ice round about it. It was empty, but scattered about there were found a number of objects, most of which were lying together on and around a piece of balloon-cloth. This seems to have served as a waterproof covering and had evidently been pulled away by animals, which had scattered and mixed the articles. Quite near the sledge there were also found two baskets about two feet square and one foot deep. Here we obviously have the provision baskets which we have encountered in the diaries under the names of "front basket" and "rear basket." At the same place there were also found the three pairs of Canadian snowshoes forming part of the equipment of the expedition.

Before we proceed to give a more detailed account of the objects found around the sledges and in the boat, we shall examine the dwelling a little more closely. As described above, this consisted of a square, bordered to the south-east by the wall of rock, to the north-east by the bone of a whale, and, on each of the two other sides, by a log of driftwood. According to the unanimous opinion of the crew of the *Isbjörn*, the purpose of the whale-bone and of the logs of driftwood had been to hold fast a tent-cloth; they had been laid on a skirt of the latter, weighting it against being blown away in a storm. No proper tent-cloth was observed, but what was found is stated to have been balloon-cloth or oiled tarpaulin. Scattered about within the square were found a number of pieces of wood which seem to have been used as a substructure for the tent-floor. Here and there were also found remains of some kind of red rubber cloth, which was thought to have formed the floor of the tent. The sealers' description agrees very well with the account given by Andrée of the expedition's tent, in which he says that it was made of balloon-silk. The floor was of a trebly varnished silk, the other parts were of silk varnished only once. The whole was sewn together in such a way as to form a kind of sack. The whole weight of the tent amounted to 111 pounds. According to the accounts of the expedition which are still preserved, a calico model had been made by C. G. Rylander of Stockholm, evidently in accordance with specifications supplied by Andrée, and the actual tent had afterwards been made of varnished balloon-cloth. In addition, there were found within the square two bamboo poles, one about six and a half feet long, the other about ten feet. These are supposed to have been tent-poles.

Frænkel's remains were found in about the middle of the tent, and behind them, close to the north-eastern wall, lay a sleeping-sack of reindeer-skin, frozen and wrinkled. It was on the low ridge of rock just above the sleeping-sack that the *Bratvaag's* people found Andrée's body. Andrée and Frænkel had thus expired within the tent, lying about a yard from each other; they had been lying on the floor of the tent, and the sleeping-sack lay close at hand.

A number of articles of the equipment were also found in the tent; for instance, right over Frænkel's skeleton there was a provision-basket lying upside down, with a piece of canvas fastened to it to serve as a lid, and among the clothes from the trunk of Andrée's body were discovered several stockings, mittens, and the torn remnants of a white blanket with a blue border. Blanket pieces were also found in other places close to the floor of the tent; these pieces probably belonged to more than one blanket. Finally, among the things found near Andrée's skeleton there may be mentioned an axe, a tin box containing lanoline ointment, a long fishing-line fashioned of a string and some bent pins, which, according to his notes in the diary, Andrée had made on August 26, and with which he had in vain tried to catch something on the twenty-seventh. Between the two bodies lay one of the single-barrelled guns. One find which, in the first reports of the discovery, awakened attention was that of a Primus stove, which stood on the rocky shelf above Andrée's skeleton, and which was still almost quite full of paraffin. This Primus stove had belonged to the cooking apparatus of the expedition, the greater part of which was found in the tent or in its immediate vicinity outside. Close to the Primus stove stood an aluminum cup, and one gained the impression that the rocky ledge had served as some kind of shelf. This was confirmed, too, by the *Isbjörn's* find when, on the same ledge above Frænkel's remains, there were found a spirit stove, a cooking vessel, and an aluminum spoon. A gilt fruit-knife was also found here. Down in the tent lay other cooking utensils, among other things a pan and a plate on which were some remains of food; there were also some provision boxes. Here, too, lay a wooden box, containing sewing materials and the expedition's supply of money, amounting to 160 rubles and 80 dollars in gold and silver.

A large number of articles lay spread about outside the tent. Among them may be mentioned the expedition's medicine-chest containing the medicine and bandaging requisites, a wooden box containing a large supply of matches, the bronze grapnel, etc.

Here also lay scattered parts of the skeletons of the two men who had died in the tent, which had been pulled outside by animals.

At a distance of about 32 feet from the tent stood five or six logs of driftwood piled up in a cleft of the rock. They were between three and five feet long, with a diameter of about six inches. Farther away lay another heap of smaller-dimensioned timber. During that summer driftwood had been observed lying all along the shore, and it must be accepted as certain that the two piles of wood had been made by Andrée and his comrades. Only a single sawn piece of wood was found, and a couple of fragments of wood were thought to have a faint smell as of paraffin or benzine. But no trace at all has been found of a fire-place.

So much for the structure of the Andrée camp. We must now turn to a detailed examination of the equipment of the expedition. From the diaries we have lists of the loads carried on the different sledges. Most of these lists refer to the food supplies which were carried by Andrée and Strindberg in two baskets on each sledge, the "front basket" and the "rear basket," as they were called. But there are also lists of the total loads of the different sledges, and of special interest are the lists made on August 10, as they give the loads for each of the three sledges on the same date, and thereby give us a general inventory of what the party then actually possessed.

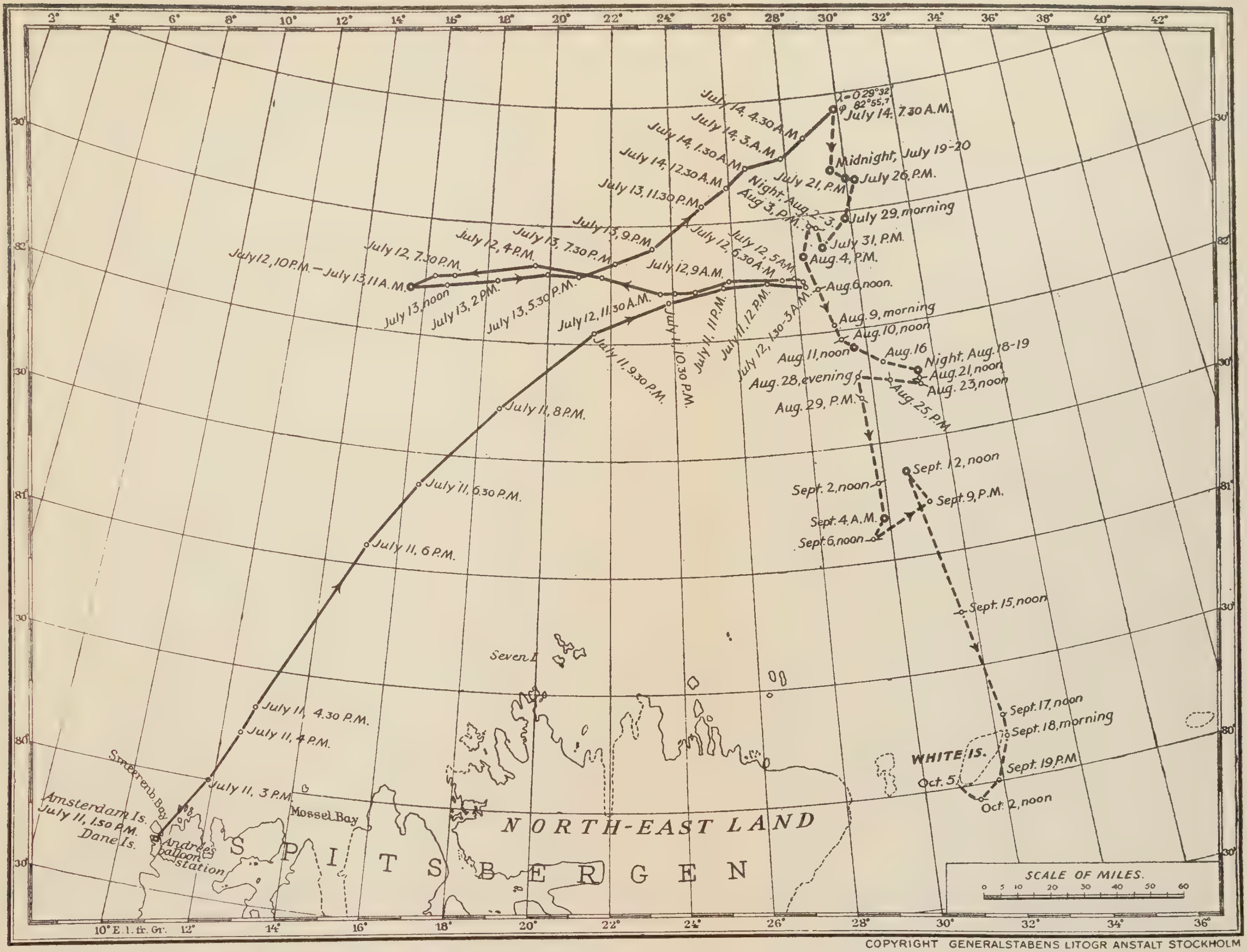
On his sledge, Andrée drew a load of 295 pounds. This consisted of the "front basket" and the "rear basket" with the supplies of provisions, a "private sack," evidently containing his clothes and other personal items, a small sack, a medicine-chest, ammunition weighing 14.3 pounds, a gun, a sextant, a sack of photographic paraphernalia, the tent, two tent-poles, and 11 pounds of meat.

Strindberg's sledge carried a load of 310 pounds. This consisted of a "front basket" and a "rear basket," a "private sack," boot-grease, a bag of tools, sewing materials, photographic apparatus, the stand of the theodolite, the small and the large field-glasses, a spade, a grapnel with a line, a boathook, and three pairs of snowshoes.

On his sledge, Frænkel drew a load of 338 pounds. This load consisted of the boat, a "private sack," a sleeping-sack, three blankets, a sack of "boot-hay," the cooking apparatus, spirits and the table-service, etc., one case of matches (evidently the wooden box found near the tent), a gun and gun-case and cleaning-box, ammunition weighing 7.7 pounds, a sack of books, an altazimuth, two pairs of field-glasses, an aneroid-barometer, a psychrometer, a change-sack (belonging to the photographic equipment), a hose weighing 7.7 pounds, three poles, three pieces of wood, two oars, a piece of driftwood, and a tarpaulin.

The above inventory corresponds in almost every item with the groups of objects which have now been brought back from White Island. There are some differences. There is wanting, for instance, one of the four baskets of provisions, the stand for the theodolite, the spade, and the cleaning-box for the guns; in addition only two pairs of field-glasses have been found, while, on Strindberg's and Frænkel's sledges, there were two pairs for each. But, to make up for this, we have now a number of articles which are not on the lists of August 10; among these may be mentioned the third gun, an anemometer, and various other instruments. But otherwise the agreement is complete. The "private sacks" are represented by three fragments of so-called seaman's-bags, each with its clamp and a hanging-lock and key for each. The medicine-chest, the chests of ammunition and matches, the guns, the sewing materials, the sleeping-sack, the blankets, the cooking apparatus and table-service, a parcel of books and charts wrapped up in an oil-cloth which is possibly the remains of an oil-cloth sack, the photographic apparatus, the sextant, and the other instruments can now be viewed again in reality. The photographic bag carried by Andrée is represented by some fragments of a sack found near

MAP OF THE ROUTE TAKEN BY THE ANDRÉE EXPEDITION JULY 11–OCTOBER 5, 1897


July 14, 7.30 A.M.
λ = 0 29°32
φ 82°55,7
July 14, 4.30 A.M.
July 14, 3 A.M.
July 14, 1.30 A.M.
July 14, 12.30 A.M.
July 13, 11.30 P.M.
July 13, 9 P.M.
July 13, 7.30 P.M.
July 12, 4 P.M.
July 12, 7.30 P.M.
July 12, 10 P.M. – July 13, 11 A.M.
July 13, noon
July 13, 2 P.M.
July 13, 5.30 P.M.
July 12, 11.30 A.M.
July 12, 9 A.M.
July 12, 6.30 A.M.
July 12, 5 A.M.
July 12, 1.30-3 A.M.
July 11, 12 P.M.
July 11, 11 P.M.
July 11, 10.30 P.M.
July 11, 9.30 P.M.
July 11, 8 P.M.
July 11, 6.30 P.M.
July 11, 6 P.M.
July 11, 4.30 P.M.
July 11, 4 P.M.
July 11, 3 P.M.
Amsterdam Is.
July 11, 1.50 P.M.
Dane Is.
Smeerenb. Bay
Andrée's balloon station
Mossel Bay
Seven I.
Midnight, July 19-20
July 21, P.M.
July 26, P.M.
Night, Aug. 2-3.
Aug. 3, P.M.
July 29, morning
July 31, P.M.
Aug. 4, P.M.
Aug. 6, noon.
Aug. 9, morning
Aug. 10, noon
Aug. 11, noon
Aug. 16
Night, Aug. 18-19
Aug. 21, noon
Aug. 23, noon
Aug. 28, evening
Aug. 25, P.M.
Aug. 29, P.M.
Sept. 12, noon
Sept. 2, noon
Sept. 9, P.M.
Sept. 4, A.M.
Sept. 6, noon
Sept. 15, noon
Sept. 17, noon
Sept. 18, morning
WHITE IS.
Sept. 19, P.M.
Oct. 5
Oct. 2, noon
NORTH-EAST LAND
SPITSBERGEN
SCALE OF MILES.
0 5 10 20 30 40 50 60
2° 4° 6° 8° 10° 12° 14° 16° 18° 20° 22° 24° 26° 28° 30° 32° 34° 36° 38° 40° 42°
10° E. L. fr. Gr. 12° 14° 16° 18° 20° 22° 24° 26° 28° 30° 32° 34° 36°
30' 82° 30' 81° 30' 80° 30'

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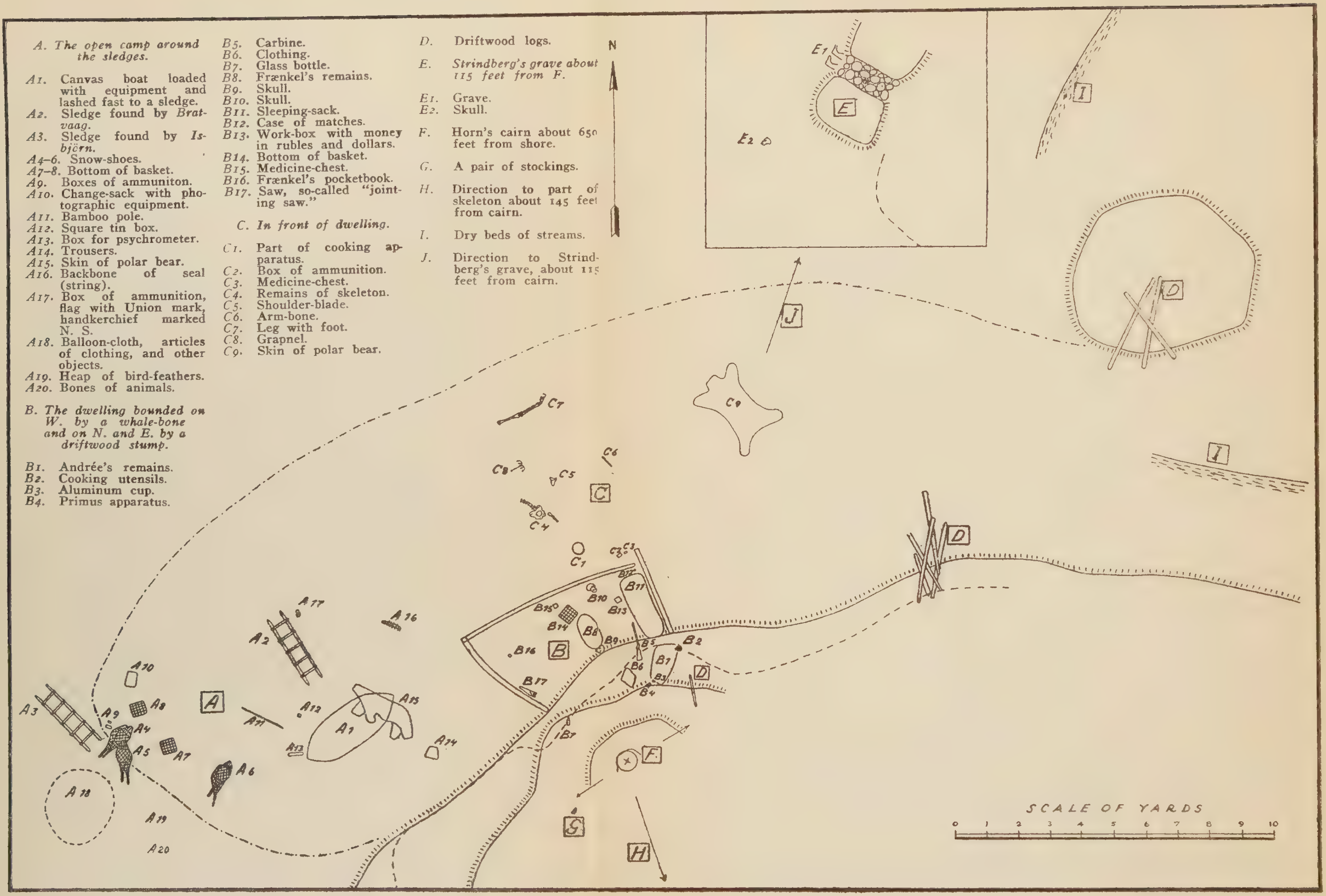
——— FLIGHT OF THE EAGLE, JULY 11–14

– – – – MARCH AND DRIFT OVER THE ICE, JULY 14 – OCT. 5

PLAN OF THE CAMP AND EQUIPMENT ON WHITE ISLAND AS FOUND


N
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A
A12
A15
A11
A1
A5
A7
A6
A13
A14
B7
F
G
H
A18
A19
A20
SCALE OF YARDS
0 1 2 3 4 5 6 7 8 9 10

A.	*The open camp around the sledges.*
A1.	Canvas boat loaded with equipment and lashed fast to a sledge.
A2.	Sledge found by *Bratvaag.*
A3.	Sledge found by *Isbjörn.*
A4–6.	Snow-shoes.
A7–8.	Bottom of basket.
A9.	Boxes of ammuniton.
A10.	Change-sack with photographic equipment.
A11.	Bamboo pole.
A12.	Square tin box.
A13.	Box for psychrometer.
A14.	Trousers.
A15.	Skin of polar bear.
A16.	Backbone of seal (string).
A17.	Box of ammunition, flag with Union mark, handkerchief marked N. S.
A18.	Balloon-cloth, articles of clothing, and other objects.
A19.	Heap of bird-feathers.
A20.	Bones of animals.
B.	*The dwelling bounded on W. by a whale-bone and on N. and E. by a driftwood stump.*
B1.	Andrée's remains.
B2.	Cooking utensils.
B3.	Aluminum cup.
B4.	Primus apparatus.
B5.	Carbine.
B6.	Clothing.
B7.	Glass bottle.
B8.	Frænkel's remains.
B9.	Skull.
B10.	Skull.
B11.	Sleeping-sack.
B12.	Case of matches.
B13.	Work-box with money in rubles and dollars.
B14.	Bottom of basket.
B15.	Medicine-chest.
B16.	Frænkel's pocketbook.
B17.	Saw, so-called "jointing saw."
C.	*In front of dwelling.*
C1.	Part of cooking apparatus.
C2.	Box of ammunition.
C3.	Medicine-chest.
C4.	Remains of skeleton.
C5.	Shoulder-blade.
C6.	Arm-bone.
C7.	Leg with foot.
C8.	Grapnel.
C9.	Skin of polar bear.
D.	Driftwood logs.
E.	*Strindberg's grave about 115 feet from F.*
E1.	Grave.
E2.	Skull.
F.	Horn's cairn about 650 feet from shore.
G.	A pair of stockings.
H.	Direction to part of skeleton about 145 feet from cairn.
I.	Dry beds of streams.
J.	Direction to Strindberg's grave, about 115 feet from cairn.

and under the metal boxes containing the expedition's films—both those they had taken and those that remained unexposed.

The sledge found beneath the boat when the latter was hewn free from the ice was, therefore, Frænkel's. It lay drawn up with its head off-shore, just as we may imagine Frænkel to have left it on coming to the camping-place. As already mentioned, the boat lay on its side with the port rail uppermost. On this side the lashings, by means of which it had been made fast to the sledge, had been torn off, but this was not the case on the starboard side. The lashings had been attached to the gunwale of the boat in two places on each side, one near the after part and one near the bow. Under each of these four fastenings, there had lain a cigar-shaped oil-cloth cushion, wound round with a red tape; all these cushions lay in their original positions. The boat was filled with a large number of objects, many of which we recognize from the packing-list of August 10. For example, there still lay in the after part of the boat the altazimuth and the parcel of books; in addition, there were found a field-glass and two guns. The box containing the psychrometer and two aneroid barometers lay close beside the boat and had evidently been pulled out by some animal; the change-sack, on the other hand, lay frozen down in the ice some distance away. Of the objects from the other sledges, the photographic apparatus and the boathook lay in the boat; this latter was the celebrated bronze boathook with the inscription "Andrée's Pol. Exp. 1896," by which the camp had at once been identified. But the sleeping-sack, the blankets, the cooking apparatus—with the exception of a tank which still remained here—the table-service, and the case of matches had been taken out of the boat, and these objects were discovered in a more or less ruined condition up in the tent. The boat contained many other things, however, which were not specified in the packing-lists of August 10. As this fact also gives a picture of the richness of the equipment, some examples may be mentioned here. Of the provisions supply there were found 5 five-litre[1] aluminum boxes and 7 lids for these, 1 two-litre and 3 one-litre copper boxes, 1 preserve-box for preparing bouillon, 1 medicine-chest, 2 boxes of spices, and 4 additional preserve-boxes. Besides these, there lay here an aluminum ladle, an aluminum box containing copper tacks, a hammer, 2 files, 2 chisels, a bore, a bundle of awls, a whetstone, screws, nails, staples, and copper wire. Here lay also two pulling-gears with yokes, a carrying-strap, three sail-maker's palms, two blocks and tackle, a reel for a long fishing-line, and an iron harpoon. In a tin box lay a typewritten scientific memorandum by the two Swedish geologists A. G. Nathorst and G. de Geer; in a green-coloured tin case was a maximum-and-minimum thermometer set. There were also a box of drawing instruments, a measure, a spring-balance for weighing up to 12 hectogrammes,[2] a work-box, various articles of clothing such as parts of a tarpaulin-coat, a south-wester, mittens, stockings, woollen jerseys, skeins of yarn, strings, ropes, etc. Finally, one object which claims our special interest is a plankton drag-net covered with balloon-cloth and constructed out of a tea-strainer with a filtering-cloth made of a silk necktie, and a rim of thin copper. This is evidently the same plankton drag-net which Andrée in his diary for September 15 states that he had manufactured on the ice. Whether the above-mentioned fragments of a tarpaulin-coat are parts of the coat which Andrée says, on August 12, that he intends to make and of the waterproof which he states on the fifteenth, that he has sewn, must remain a riddle. Finally, among the finds in the boat there should also be mentioned a part of the back of a polar bear and the sawn-off ribs, also of a bear, which constitute the remainder of the supply of provisions.

The second connected find-complex discovered in the open camp was the balloon-cloth which had been used as a cover for some of the articles belonging to the expedition, and which now lay close to the sledge found by the *Isbjörn*. The various articles were scattered pell-mell on and around the balloon-cloth. They consisted for the most part of clothes, among which may be mentioned two shirts, two pairs of drawers, and five handkerchiefs which had belonged to Frænkel; an undershirt, a blue-and-white striped woollen jersey, like those which were round Andrée's skeleton, a pair of stockings resembling those on Strindberg's remains, a stocking marked N.S., and another with Andrée's mark. In addition, there were found a pair of fur gloves and one odd fur glove into which had been thrust a magnifying-glass, a pair of knee-protectors of grey yarn, a fur cap, a south-wester, a blue-and-white checkered necktie, and other articles and fragments of dress, as well as 4 towels marked "Andrée's Pol. Exp. 1896." Of the instrument equipment there were found, in addition to the magnifying-glass already mentioned, a sextant in its box, a field-glass in a leather case, a Halda watch, and two chronographs. In this connexion, there may also be mentioned among the finds made here, Strindberg's second logbook and a map of the route they had taken, Frænkel's almanac, three typewritten memoranda by Nathorst and de Geer (the same as those found in a tin cylinder in the boat), letters to Strindberg and Frænkel, and a number of photographs. Here, too, were found the bag already mentioned containing the rolls of film which were enclosed in metal cylinders, and a similar cylinder containing a number of specimens of organic remains which had been found during the month of August on the journey across the ice. Among the objects belonging to the personal equipment of the party may be mentioned three pairs of spectacles, a purse containing, among other things, some coins and a watch-chain, two seamen's-bags, a toothbrush lying in a rubber bag, a hairbrush, and a box of surgical instruments. Finally there was found here the balloon-flag, which was of white silk bearing a blue anchor.

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[1] One litre=.22 gallons or 1¾ pints.

[2] A hectogramme=.22 pounds or 3½ ounces.

In a word, objects of the most diverse kinds lay scattered about the camp-site. Of these we may limit ourselves to mentioning a bundle of clothing, with a belt around it, containing a blue jacket, a woollen jersey, and the following articles marked N.S.: a pair of short mittens, one pair of gloves, and one stocking. As Strindberg's remains were dressed in a waistcoat and nothing else, it is probable that this whole bundle of clothing had belonged to him.

This survey of the most important articles found at the camp may give some idea of the variety in the equipment that the expedition took with it on its journey across the ice, but we must still suppose that these articles constitute only a part of what was originally carried in the balloon. The accounts which have been preserved give us some idea of that part of the equipment of the expedition which had been purchased, but, in addition to these, there were a great many gifts given to the party either as an advertisement of the various articles presented, or merely out of interest in the expedition. As an illustration of the wide-spread enthusiasm which had been aroused by Andrée's enterprise we need but mention the flag with the mark of Union which was found beneath the ice in the neighbourhood of the boat and which bore an embroidered inscription: "Simon Gustafsson Karlstad." It had been presented by a Swede who had emigrated as a young officer to Buenos Ayres and who, at the time of the flight, was a colonel in the Argentine army.

One is tempted to give, on the basis of available accounts, a list of the original equipment of which a part was brought to the last resting-place of the expedition. But the reader is probably already fatigued with the details hitherto given, and space does not allow of such a synopsis; it is sufficient to say that this subject alone would make a whole treatise.

But we shall give some time to an examination of a few aspects of the expedition's equipment. In the first place, we must consider its supply of provisions and clothing, for, after the landing on White Island, it was on this that the fate of the three men ultimately depended. A few words must also be said respecting the notes or other documents concerning the polar world which were made by the expedition and which have now been found. But since the exactness of the notes concerning place-determinations or certain other physical observations depends on the scientific instruments that the party carried, a few lines about the latter are also necessary.

The notes embrace: (1) Andrée's large diary which was found close to his body in the tent and (2) the fragment of a diary discovered in his jacket-pocket; (3) Strindberg's almanac, with notes on the whole journey, which was found near Frænkel's skeleton in the tent; (4) his first logbook, embracing the period July 15–September 4, discovered in the after part of the canvas boat; (5) his second logbook covering the period up to and inclusive of October 2, and which, at the end, contained two accounts, intended for his fiancée and written in shorthand. This book was found among the objects lying around the balloon-cloth down by the *Isbjörn* sledge. Finally, we have (6) Frænkel's journal with meteorological observations, found close by Frænkel's skeleton.

The instruments that the expedition had for making course- and place-determinations were the same as those employed by seamen on the ocean, but modified for use in the car of a balloon. They consisted of a universal-instrument or altazimuth, three sextants, one mercury-horizon, two pocket chronometers and a watch of Swedish make from the Halda works, two chronoscopes, and diverse charts. Finally, there was a light little altazimuth, a so-called travelling theodolite, for observations on land. For course-determinations—the seaman's dead reckoning—there was a log especially constructed to determine the magnetic course of the balloon, from which, together with a knowledge of the height of the balloon, the real speed could easily be calculated. The height was determined by means of a range-finder in the form of a sextant, or by means of a kind of plumb-bob. Two level-mirrors were used for measuring height and distance. In addition the expedition possessed, altogether, nine compasses of different kinds, besides a specially constructed magnetometer, by means of which it was possible to determine the direction of the magnetic attraction and its strength.

Of meteorological instruments the expedition carried: a nautical barometer, an Assmann's psychrometer, two Koppe's hair hygrometers, a maximum-and-minimum thermometer set in a case, a wind gauge, the so-called Schalen-Kreuz anemometer, two sun-thermometers, two barographs, an aneroid-barometer, a Davy-Aragos actinometer, streamers, and a cloud mirror. In addition there were three pairs of field-glasses from Zeiss of Jena, and three photographic apparatus. Two of these were intended for pictures 13 x 18 cm.[1]; the third was a so-called Bullet-camera for pictures 8 x 8 cm.[2] and was intended for the possible sledge journey. Finally may be mentioned tubes for air-samples, an outfit for collecting bacteria, and various scientific hand-books and tables.

At the close of the balloon flight the greater part of this carefully chosen equipment was brought down to the ice. Most of the instruments just mentioned had been arranged on a wooden ring especially put up for the purpose in the roof of the car and carried by supports set in ball-and-socket joints. Some of the apparatus, such as the altazimuth and the magnetometer, had been mounted on a special little table attached to this wooden ring. It is, of course, probable that a part of this equipment was left in the car when it was deserted, especially as some of the instruments had been constructed with a special view to the balloon flight. And under any circumstances, to carry these sensitive and bulky objects on a journey across the ice would have been extremely troublesome and would have meant too great a loading of the sledges. The instruments that the expedition succeeded in bringing to White Island, and which have now been brought away from there are the following:

For determining the course and position: an aluminum sextant

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[1] 5.2 x 7.2 inches.

[1] 5.2 x 7.2 inches.

in a wooden box; the five timepieces; Hildebrand's travelling theodolite in a wooden box; Elfving's level-mirror; three compasses, two of them with a diopter; and a number of maps and charts. Of the meteorological instruments there have been found: a nautical barometer; a little aneroid-barometer; the psychrometer in its wooden box; the maximum-and-minimum thermometer set in a green tin box; and the anemometer in its wooden box. In addition there have been brought back a field-glass and a telescope of peculiar construction with three oculars attached to an adjustable disk. Finally, there have also been found one of the three photographic apparatus, together with a number of reserve parts and the "change-sack" of black-and-red cloth which had been taken along to use in changing the film-rolls.

The photographic equipment had consisted of 30 rolls of films 13 x 18 cm., of 48 films each, and 12 rolls of Bullet-films, 8 x 8 cm., of 20 films each; they were all enclosed in especially constructed brass cylinders. Of the 13 x 18 cm. films there were found in the camp seven rolls enclosed in brass cylinders, of which two rolls were unexposed, one possibly exposed, and four certainly exposed; of the latter, twelve photographs have been successfully developed. In addition, there was a cassette with one of these rolls in the camera, and another roll lay amidst the *Isbjörn* find, wrapped in rags from the change-sack; this last roll is quite black. Of the Bullet-films there were found eight rolls all unexposed. Finally, there was discovered the greater part of the samples mentioned in the diary for the month of August. Sample No. 15 with the "soup algæ" (August 23), and sample No. 16, of the same date, with the eyes of the young gull that had been shot, were enclosed in glass tubes. The rest had been put into envelopes and deposited in two containers: a tin box and one of the brass cylinders for the film-rolls. In the cylinder there lay, wrapped in its gauze bandage, sample No. 17 mentioned under the date August 24.

We obtain some idea of the expedition's supply of provisions from the stock-takings carried out on July 17 and on August 5, to the latter of which Andrée has appended the remark that "this stock-taking shows that we must be careful, with bread especially." The several inventories of the contents of the provision-baskets on Andrée's and Strindberg's sledges give us further valuable information. The provisions were constantly being supplemented by hunting during the course of the march across the ice. When the ice broke beneath them on October 2, the party was well supplied with meat; how much of this they were able to carry over to White Island we do not know. Neither have we any knowledge of the supplies remaining when they were compelled to leave the ice. We obtain some idea of it, however, by the number of the tins in which they had been preserved. According to the account given by Andrée concerning the equipment of the expedition, the provisions were kept in aluminum or copper boxes of three different sizes; one holding 5 litres, one 2 litres, and one 1 litre. The total weight of the provisions amounted to 1687 pounds, 440 pounds being made up of water and spirits, kept in aluminum tanks. These vessels had been made by Johan Eriksson, of Stockholm, but it is now impossible to say how many of each kind he had supplied. The following tins and other vessels made by Eriksson have been found at White Island: 2 aluminum tanks of 5 litres, with a screw-lid in the middle (these were evidently intended for fluid contents); 9 aluminum tanks of 5 litres, and 10 lids; 2 copper tanks of 5 litres, with a little screw-lid in one corner (these, too, were intended for liquids). There were also 2 bottoms, which had evidently formed part of such vessels. In addition, 3 copper tanks or boxes of 2 litres, 11 copper tanks or boxes of 1 litre, besides 2 fragments and 2 lids. In addition there were found 2 preserve-tins for preparing bouillon; 9 other preserve-tins; 2 sardine boxes; 3 round aluminum boxes with lids, one still containing coffee; 3 little tins, probably for spices; and 2, as yet unopened, preserve-tins, one of them probably containing pâté de foie gras. A great number of these vessels, the square ones especially, were much dented. We do not know if they were all still filled when the party landed. Neither do we know how many of them may have been empty by the time the men died, as they may have been destroyed long afterwards by the trampling of the bears. The appearance of the camp at this spot, however, does not give the impression of a want of food, but rather the contrary.

Whatever the amount of meat the party had gathered together while on the ice and succeeded in bringing ashore, the men can hardly have suffered from lack of meat, for there were found in the boat remains of the back and ribs of a polar bear that had been cut up. And out on the camp-site there lay two polar-bear skins. A discussion arose regarding these skins between the skipper of the *Isbjörn* and one of the sealers, the former being of the opinion that it was a summer pelt, the latter holding that it was an autumn coat. The heads had been removed. Probably they had been killed on the spot, for in one skin there lay a number of pieces of bones, and in the sealer's opinion the skin showed the fat to have been cut away in a frozen condition. A number of sawn-off polar bear bones were also found. In addition there was the sawn pelvis of a great seal, and a skeleton of another seal (*Phoca hispida*), which had also been divided by means of a saw. Lastly, there was found a little heap of bird-wings, ten at least, and other skeletal remains of birds; these were thought to be the relics of ivory gulls.

The party, therefore, must have been well supplied with meat and had the opportunity to secure more.

The expedition had taken with it two single-barrelled Remington smooth-bore guns of .20 calibre; a double-barrelled gun with top-lever mechanism, of which the right barrel was a smooth-bore, of .20 calibre, and the left spiral-grooved, of .45 calibre. They also had a revolver. The three guns, which were a present from the Huskvarna Arms Company, were all found at White Island, one of the Remington guns close by Andrée's skeleton, and the two other guns in the boat. Of the supply of ammunition, besides a number of cartridges found in the dead men's pockets, there remained at least 135 ball-cartridges and 120 small-shot cartridges, packed in three nailed wooden boxes.

Neither was the party in want of fire and fuel. In addition to the matches the dead had about them, there was found in a nailed wooden case a hundred small boxes containing fusees and ordinary matches. The Primus stove was full of paraffin, and they also had driftwood. The cooking apparatus and the Primus stove—of the B. A. Hjort & Co. (Stockholm) make, well known to all polar travellers—was in perfect order and lay beside the cooking and snow-melting vessels. After being brought back to Stockholm experiments showed that the stove could still make a litre of water boil in six minutes. In a pan and on a plate which were found in the tent there were still some remains of food. Hence, as regards food supplies, the situation seems to have been as advantageous as could be wished.

On the morning of July 13, Strindberg made a list of his equipment. He was then dressed in: a Jaeger woollen jersey, a Jaeger shirt, Jaeger pants, a suit of blue cloth, a woollen-lined leather waistcoat, a pair of thin woollen stockings, a pair of long wool-and-hair stockings, fur-lined snowboots, a cap, and woollen mittens. This list can be compared with the garments in which his dead body was dressed. These consisted of a Jaeger wool jersey nearest the body and, above this, a Jaeger wool shirt with front and wristbands of striped linen; a pair of rather thin drawers, and a pair of thicker ones outside these, both marked N.S.; trousers and waistcoat of blue cloth; a pair of thin woollen stockings marked N.S., and a pair of thick stockings of checked pattern; Lapp shoes with senne-grass and puttees. It was evident that his jacket had been taken off. Out in the camp there was found a single jacket and since this and a woollen jersey were, as we have already mentioned, tied up in a belt with a number of other articles of clothing marked N.S., it may safely be asserted that the jacket and the jersey had been worn by Strindberg. In the camp there was also discovered the black-and-white checkered cap he is seen wearing in the photographs of the start.

The picture thus gained of Strindberg's equipment is in the main similar to those of Andrée and Frænkel. Andrée's body was dressed in a Jaeger wool jersey and a flannel shirt, a pair of thin Jaeger drawers and, above these, a thicker pair of brown wool, knee-protectors of grey woollen yarn, trousers, waistcoat and jacket of blue cloth, the jacket with an embroidered A. on the inside; in addition, a woollen jersey with wide crossed stripes of blue and white, and outside this a white sweater. We do not learn from the accounts of the find whether these latter articles were worn inside or outside the waistcoat, but the latter is probably the case. On the left foot there were two thin woollen stockings marked with a star, and a wool-and-hair sock; on the right foot he had one thick stocking unmarked and a wool-and-hair sock like that on the left foot. Finally, he was wearing Lapp shoes and puttees. Among his clothes there were also found two caps of brown striped wool, resembling those worn by him and Frænkel in the photographs we have of them.

Frænkel's clothes consisted of a cross-striped undershirt of wool, marked K.F., a flannel shirt with grey stripes and a soft collar, a waistcoat of brown cloth, a chamois-leather waistcoat with green lining, a thick knitted woollen jersey, and a brown coat with the remains of a fur collar laced on. Of Frænkel's body, only the upper part was found inside the tent; the lower extremities were discovered some distance outside and wore no trace of clothes. But out in the camp there were discovered two pairs of trousers of brown cloth, of which one pair was unused while the other was much torn, as was all the clothing around the upper part of Frænkel's body. These trousers were buttoned as if they had been worn. Further, there were found fragments of drawers of the same grey-striped wool as Frænkel's undershirt; the drawers were torn in such a way that the pieces correspond perfectly to the second, torn pair of trousers. These articles of clothing, therefore, must have belonged to Frænkel. But the pair of brown breeches were not trousers like those worn by Andrée and Strindberg; they were short knickerbockers. This explains why the lower part of Frænkel's body had been so torn to pieces by beasts of prey, the legs not having the protection afforded by long trousers and puttees. A pair of badly damaged Lapp shoes were also found in the camp.

Aided by a knowledge of the clothes in which the dead men were dressed and by the marks on certain articles of clothing, a certain reconstruction of their personal equipment can be made from the articles of dress found scattered about on the ice. The problem is easiest in the case of Strindberg's clothes, for they were very carefully marked.

Strindberg's equipment consisted of: an undershirt, marked N.S., somewhat thicker than the one in which he was dressed, and a perfectly similar, but unmarked, shirt; a pair of thick woollen drawers marked N.S.; fragments of two cotton shirts with blue and brown stripes, marked N.S.; two pairs of thin woollen stockings resembling those his body was wearing and marked N.S.; nine thick white woollen stockings marked N.S.; one pair of knitted mittens, one of them marked N.S.; three pairs of knitted gloves marked N.S.; and one pair of thick gloves with long wristlets of the same material as the mittens, and marked N.S. Finally, there were found three handkerchiefs with the same initials.

Of the articles which had belonged to Andrée there were found: an undershirt of wool; two pairs of drawers like the under ones in which his body was dressed, and one pair like the outer drawers on the skeleton; a pair of thin woollen stockings of two different sizes, evidently intended to be worn outside each other, and eleven similar stockings, marked with a star as were also two of those the body was wearing (a number were turned inside out; some had never been used and were still sewn fast to each other in pairs). In addition, there were found three stockings of the same quality as the one he was wearing on the right foot. Finally, there was found a parcel of seven handkerchiefs tied with a ribbon; six of these were marked S.A. and one G.F. Among the clothing near his skeleton there was also found the lining of a chamois-leather waistcoat.

Of clothing that had belonged to Frænkel, there was found a shirt with the same crossed stripes as those on his undershirt, and two pairs of drawers of the same material; one of these was marked K.F. There was also a fragment of another similar pair of drawers, found in the boat; five pairs of thin blue-grey stockings, and two thicker stockings which were unmarked, may possibly have belonged to him. In addition there were found five handkerchiefs with his monogram and one marked "K. Frænkel." Finally, out in the camp there were discovered three fur caps, one marked A., one marked S., and the third unmarked.

In addition to the above-mentioned articles of clothing there was found, of course, some equipment that cannot with certainty be ascribed to any individual. These consisted of a blue-and-white striped woollen shirt and a sweater like those in which Andrée's skeleton was clad; two jerseys of blue woollen yarn—it was in one of these that Andrée's first diary was lying—with fragments of two, possibly three, hoods of the same material; three capuchins of blue cloth, a black leather waistcoat with red lining, possibly belonging to Strindberg; two pairs of knitted gaiters, and two pairs of leg-protectors of linen with woollen lining. These may possibly have belonged to Frænkel. From accounts still in existence we know that "two pairs of leg-protectors" had been purchased, and this would be quite natural, of course, as he was wearing knickerbockers. In addition, there were found four pairs of wool-and-hair socks, and one pair of stockings of the same material; two and a half pairs of leather gloves and one pair of knitted gloves; three knitted driving-gloves and the remains of some fur gloves; one pair of mittens like Strindberg's; one pair of knee-protectors, unused and sewn fast to each other; the remnants of one knee-protector; fragments of two or three jackets of balloon-cloth, and one pair of trousers of the same material; two south-westers; three pairs of boots; one pair of Lapp shoes of untanned skin, found in the boat; and, finally, three pairs of Canadian snowshoes. There were also found four neckties of silk and one of cotton, and some fragments of handkerchiefs.

After this account of the articles of dress found on White Island, it may be of interest to see what information the bills can give us of the personal equipment of the three participators in the expedition. For the three men who took part in the expedition of 1896 all purchases, even when made at the same time, were specified in the bills as against the person for whom they were made. These things formed what may be called their standard equipment. For the expedition of 1897, there is a bill for a similar equipment, evidently intended for Frænkel. These equipment-lists thus obtained present some small differences from each other but, on the whole, they are very much alike. For example, let us take Strindberg's equipment, 1896. It consisted of 3 pairs of drawers, 3 pairs of drawers of cheaper quality, 3 undershirts, 9 pairs of socks, 3 pairs of stockings, 3 flannel shirts, 1 Iceland jersey, 1 sweater, 1 leather waistcoat, and 4 pairs of gloves, in addition to which there is one suit and one pair of English boots lined with wool. Later on he bought 1 pair of wool-and-hair socks, 2 pairs of gloves, 1 pair of snowboots (evidently a term for Lapp shoes), and 2 pairs of laced boots. The list in 1897, evidently intended for Frænkel, consists of 3 Jaeger shirts, 4 pairs of drawers, 4 pairs of stockings, 4 pairs of stockings of cheaper quality, 4 flannel shirts, 4 pairs of gloves, 2 pairs of knee-warmers, 2 pairs of leg-warmers, and a cap, in addition to which there are afterwards entered 2 pairs of field-boots, a suit for the polar expedition, and a fur collar. As will be remembered, Frænkel's jersey, when found on White Island, was provided with a fur collar.

Naturally, the equipment procured by Andrée and Strindberg in 1896 had become partly worn out, and already in that year as well as in the one following mention is made of the purchase of additional clothing, although the name of the wearer is not specifically stated. However, the first large purchase sufficiently illustrates the plan adopted for equipping the expedition with clothes.

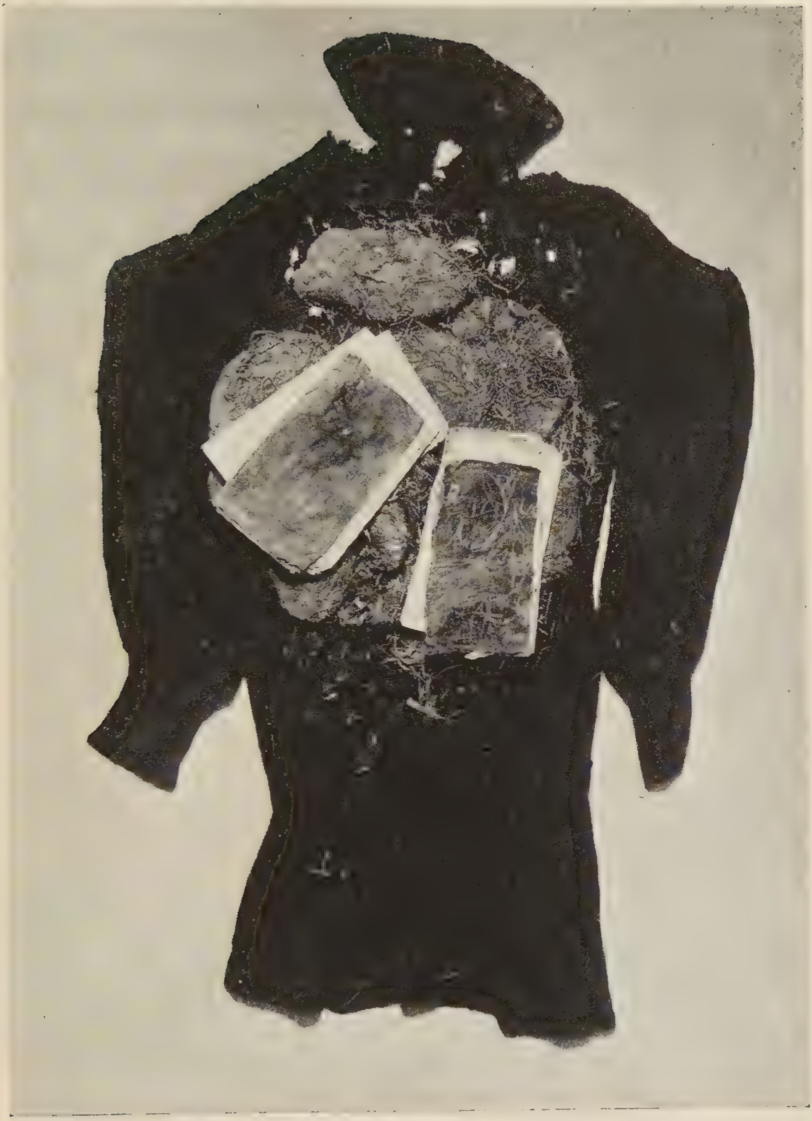
The picture we get from the accounts is in substantial agreement with that gained from the find at White Island. But the latter tells us more, for we may establish from it the *quality* of the clothing worn. Qualitatively, there is scarcely any correspondence with the demands one would make with a view to a long stay in the polar regions. Each man had a leather waistcoat and a fur cap, but otherwise there are no leather clothes, and the fur caps seem not to have been used. Not only the stockings, but the underclothing in general is fairly thin, and, moreover, several articles of underclothing must have been thrown away at an earlier stage, so that in some cases the last of the supply is being worn.

We have dwelt at such length on the clothing equipment because it seems to have been the weakest point in the preparations made for the expedition. The question was already being discussed when the remains of Andrée and Strindberg were examined. One of the participators in the *Isbjörn* expedition expressed himself as astonished at the unsuitability of the clothing for polar travelling. Among the articles he mentioned as being little suited to the purpose were the knitted gloves, the thin shirts of striped cotton, the thin woollen jerseys, and the short socks marked N.S. The jerseys also seemed to him of little value for polar wear, both as regards material and cut. Another man on board the *Isbjörn* gave it as his opinion that "the members of the expedition had frozen to death. They did not have enough clothing and were badly equipped. They had nothing but rubbishy clothes and socks!"

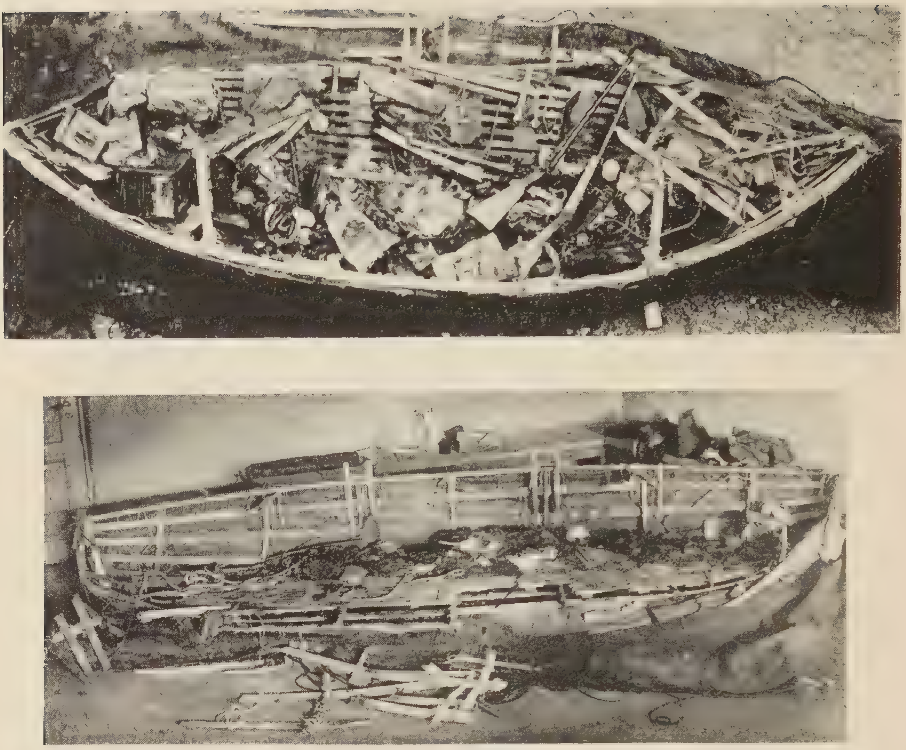
We have already seen that the party was not in want of food, and that there was ammunition for a considerable period ahead; the men had cooking utensils, matches, and fuel. But they were not equipped to meet the cold of winter on an island almost entirely covered with ice, and affording no better protection against the storms coming from the sea than their tent. This tent, too, was only made of varnished balloon-cloth and, after the long journey on the ice, was probably damaged in many places. The prospects of building themselves a snow-hut were small, the little pieces of stone-brash on the shore being unsuitable for the purpose. The sealer Sörensen of the *Isbjörn* most certainly gave the correct answer to the final riddle of the Andrée Expedition when he declared: "I think they died in their sleep! The cold finished them. In any case, they didn't die of hunger."

They suffered also from another inconvenience which was bound to grow more and more serious as time went on. The three men had but one sleeping-sack between them. To live for months in continual isolation from the world in one of the most desolate tracts on the globe must, of itself, have gradually become a serious psychical trial. Being compelled to share the same sleeping-sack night after night, a system that could not but give rise to mutual inconvenience, especially if one of their number were sick, probably rendered the situation even more trying. And, worst of all, perhaps to have been obliged to witness the death-struggles of Strindberg in that one sleeping-sack with them!

For Strindberg died before the other two, and was buried by them. During the excavation of the boat from the ice, one of the crew of the *Bratvaag* went to a little rivulet for a drink of water. There he found a skull lying by itself on the level ground, and on looking about more closely he saw a couple of Lapp shoes sticking out from underneath a bed of stone rubble. On investigation it turned out that the dead man had been laid in a narrow cleft between the rocks, and the remains covered with a foot-thick layer of rubble. In addition to the fact that the underclothing was marked N.S., there was found, where the left hand had been, Nils Strindberg's engagement ring. Tore Strindberg, the sculptor, remembered that his brother Nils had had an injured tooth in



ANDRÉE'S LARGE DIARY AND A SMALLER NOTE-BOOK
Found by his body, wrapped in senne-grass and a sweater



THE EXPEDITION'S CANVAS BOAT

a. Before being unpacked at Tromsö; b. partially unpacked; c. empty the right upper jaw, and this was found to be so in the skull discovered in the neighbourhood of the grave. In the dead man's pockets nothing was found but a black-lead pencil, but, later, when the clothing was being treated for preservation, there was discovered a little pendant trinket, consisting of a cross, an anchor, and a heart. It had probably been worn hanging from a string round the neck. The string had broken, and the objects had found their way into the clothes. In Andrée's pockets, however, there was found a purse containing, among other things, a little silver boar that Strindberg used to carry round his neck and a gold locket in the shape of a heart, with the monogram N.S. Inside the locket was a portrait of Strindberg's fiancée and a lock of hair. In one of Frænkel's pockets was found Strindberg's almanac with his marginal notes, and, inside it, a fountain-pen, which was still filled with ink.

Strindberg was followed by Andrée and Frænkel. The two men sank into their last slumber side by side within the tent and, to judge by all appearances, simultaneously. In addition to Strindberg's belongings, there were found in Andrée's pockets the following articles: in the left inside pocket of the jersey, the second diary, with a lead pencil along the edge, and a pedometer. In addition, there were found Andrée's own chronometer No. 5567, with a gold chain from which hung a locket containing the portraits of his parents, a gold heart, and a gold ring with a turquoise and two garnets. In another of his pockets there lay the chronometer No. 5566, used by Strindberg in his observations. In a jacket pocket there were found a handkerchief and the remains of a tube of some kind of ointment. In the right trouser-pocket were a pocket-knife, empty cartridge cases, and a match-box. In Frænkel's clothing there were found, besides Strindberg's almanac, a mother-of-pearl knife, a whistle of black horn, the fragments of a pair of dark spectacles, a lead pencil, and the remains of a tube of ointment. It may be remarked here that two knives just like Andrée's, and two whistles just like Frænkel's, were found outside in the camp. Of these articles, therefore, there must have been one of each kind for each man.

Strindberg's grave has been made in a narrow crevice of the rock. In a tent beneath the ridge of rock rest Andrée and Frænkel, and outside, on the ice, stands a sledge with the boat firmly lashed to it, and with the head turned towards the land, just as it had been drawn up to the spot by Frænkel. Close by stands another sledge, possibly emptied of its contents, and farther down is the third sledge. This one has its head turned towards the sea, and on or near it lies a large bundle of balloon-cloth filled with clothing, the rolls of films, the samples of scientific character, a part of the notes written by the members of the expedition, a sextant, a field-glass, a few other objects, and then the symbol of the expedition—the white balloon-flag with its blue anchor. Far away in the world outside, people are asking with anxiety what has become of Andrée and his men; their relatives and friends await with trembling every sign of life that seems to come from the Polar Sea. But around that which had been Andrée's Polar Expedition, and towards which the eyes of the world had once been directed, there now sweeps the snow-storm, or there flame above it the Northern Lights amid a silent night of glittering cold. But the snow-storm and the fearful cold torment them no more. Andrée, Strindberg, and Frænkel slumber!

Our description of Andrée's camp at White Island is ended. The three men landed here on October 5. They pitched their tent high up on shore beneath a wall of rock, and there they drew their sledges with the equipment. This was done on October 7. Then all is silent until October 17, when Strindberg notes a return to "Home" at 7.05 a.m.—the last memorandum any of the expedition made.

What took place between the seventh and the seventeenth of October? Was any attempt made to discover some more hospitable spot on the island, or did the men even climb the ice in order to explore the possibilities of reaching Spitsbergen? Great

Island can probably be seen in clear weather from the icy fell of White Island. No one can say, but the party had probably been away for a time and had returned. Then Strindberg had died. The survivors preserved the contents of his pockets. His jacket and a few other articles of his clothing were collected and fastened together with a strap——

How much longer did Andrée and Frænkel hold out? Why did they not use the two bear-skins as rugs to lie on in the tent? Why was their sleeping-sack not used? Why did the third sledge stand packed with some of the expedition's most important belongings, as if in preparation for a journey? To all these questions there will never be an answer! The only reply that can be given is in the words of the Norwegian sealer: "I think they died in their sleep! The cold finished them."

On August 19, 1898, three members of another Swedish Arctic Expedition landed on the south-western point of White Island, one among them being the compiler of this volume, Professor J. G. Andersson. The party did not dream that, had they continued some few miles farther along the shore, their steps would have brought them to the spot where Andrée, Strindberg, and Frænkel were sleeping their last sleep!

XIV

The Journey Home

On August 22 the *Terningen,* Captain Jensen, returned to Tromsö after its third sealing-trip for the summer. The skipper stated that, on the morning of August 8, they had been hailed by the sealer *Bratvaag* off Victoria Island, which reported that two days before, at White Island, they had found Andrée and one of his companions of the polar expedition of 1897, and the remains of their camp. They had taken on board everything they found in order to bring it home to Norway.

The news that Andrée's camp had been found on an island in the Polar Sea hitherto known but by few spread like wildfire. The whole world was struck with amazement. Riddles that had been forgotten for a whole generation and the solution of which it was thought would never be obtained had, in a single moment, become real again. People questioned the possibility of it. Was this a dream, or merely an unconfirmed rumour? But the rumour did not die away and it reached increasingly fantastical proportions. After the Swedish Government had obtained from its Vice Consul in Tromsö information which showed that the rumour was based on reliable grounds, the Swedish and Norwegian Governments appointed a Commission for the purpose of taking charge of the relics immediately after the arrival of the *Bratvaag* at Tromsö. As members of this Commission the Swedish Government nominated Gunnar Hedrén, Professor at the Carolean Medical-Surgical Institute in Stockholm, and Nils Lithberg, Professor at the Nordiska Museum. The Norwegian Government appointed Bertram Dybwad-Holmboe, Chief Physician of Troms, and Adolf Hoel, Lecturer in Geology at the University of Oslo. At the request of the Swedish Government the Norwegian authorities also appointed Dr. Gunnar Horn, the geologist of the Norwegian Svalbard and Polar Sea Research Institute and the chief of the *Bratvaag* expedition.

On August 28, the Swedish members of the Commission, accompanied by Andrée's nephew, Ebbe Andrée, and by the sculptor Tore Strindberg, a brother of Nils Strindberg, left by the night train from Stockholm and arrived at Tromsö on the evening of August 30.

The air was charged with excitement. There was a whole army of journalists, mostly Norwegian and Swedish, of course, but there were also representatives of all the great press syndicates of the world. There were discussions; there were interviews; telephones rang and the telegraph keyboards rattled; rumours were spread and rumours were denied. The whole formed a veritable witches' cauldron, and the constantly recurring question was: Where is the *Bratvaag?* When will it come? What will it have on board? As soon as they had arrived, the Commissioners had to make statements to the assembled journalists. These crowded the Grand Hotel only to learn that the new-comers knew less than themselves. In a moment the pressmen were scattered and gone, but then typewriters began to rattle in every room of the hotel, and every telephone communicated that the newly arrived scientific men had nothing to communicate. This news was not very sensational, but it was always something for the news-hungry editors in every corner of the globe. The next day was a Sunday; a quiet Sabbath peace rested over the beautiful little Arctic town, which was still gay with the flowers of autumn. But there was no peace in the journalist camp; there reigned a nervous rushing to and fro for fresh news which was not to be had, and so, for want of this, visits were paid to all the ancient Polar Sea skippers of the town, and their stories of youthful journeys to the northern ice or to the western ice were spread about the world. But in the afternoon the bomb burst—the *Bratvaag* lay in a Norwegian harbour.

The vessel had called at Hasvik about three o'clock and after a short stay there had continued to Skjærvö, where it arrived about eleven at night. In one instant the focus of the press world had been moved to that spot. But this was not the first occasion in the history of polar exploration that Skjærvö had been the centre of interest, for it was here that, on August 20, 1896, Nansen's ship, the *Fram,* had discharged two signal shots on its return from a three-year stay in the Polar Seas. Down at Tromsö people were discussing how the *Bratvaag* should be received, for the vessel was expected there the following morning. Meanwhile the telephones were at work between Skjærvö and Tromsö, and between Tromsö and the world, and the most contradictory rumours were started.

Monday came without a glimpse being seen of the *Bratvaag.* The explanation soon came. The Norwegian guard-ship, *Michael Sars,* which had been placed at the service of the Commission for the reception of the *Bratvaag,* after having been recalled from Iceland, was delayed. This communication, however, was received with the greatest calm. The tremendous excitement of the last few days had grown less, after certainty had been gained concerning the character of the burden that the *Bratvaag* carried. The *Michael Sars* arrived in the evening, and, after a short conference with the scientific Commission, the vessel left at midnight on its way northwards with the members on board. Simultaneously, the *Bratvaag* left Skjærvö. On board the *Michael Sars* there were two relatives of the lost men. The Northern Lights flung their narrow streamers across the black night of the closing summer.

At 3.30 in the morning the two vessels met in Ulfsfjorden, and the *Bratvaag* turned its prow towards Tromsö, under the escort of the *Michael Sars.* From the deck of the *Michael Sars* the passengers gazed at the early morning with curious feelings. Around them rose the sober-hued skerries[1], and in the distant landscape the snow-covered fells far inland shone now and then through openings amid the cliffs, while at their feet the waters lay quietly against the black hull of the little polar vessel with its mysterious cargo and its flag at half-mast. At 7.30 both vessels began to move at half-speed, and after they had drawn up alongside, the Commission went on board the *Bratvaag*. A noticeable silence now lay over everything that happened; it was as if everyone feared to disturb the slumber of the two men. Lashed fast to the afterdeck of the *Bratvaag* was a chest of rough-hewn boards under a tarpaulin, and in this the two lay side by side. On the boat-deck to starboard lay the canvas boat in which had been placed most of the objects found at White Island, and above the boat lay two polar sledges piled one above the other. The rumour that the remains of the third member of the expedition were also on board had no foundation. Dr. Horn had placed down in the cabin the bronze boathook first found, on which was the eloquent inscription "Andrée's Pol. Exp. 1896," as well as the anemometer, Strindberg's logbook, and the diary, lead pencil, and pedometer which had been found in the inside pocket of Andrée's coat. Questions were asked respecting the circumstances attending the discovery, and arrangements were made for taking everything on shore. And so at nine o'clock both vessels lay in Tromsö harbour. The Commission left the *Bratvaag,* which had anchored out in the harbour, and returned on board the *Michael Sars,* which then steamed up to the quay and moored there.

The transfer to land of the remains of the polar travellers was fixed for ten o'clock. The *Bratvaag* moved slowly up to the quay belonging to Arnesen, the Swedish Consul, where the relatives, the town dignitaries, the members of the scientific Commission, and the representatives of the press were assembled. The chest on the afterdeck was unfastened, and the coarse tarpaulin of the Polar Sea journey was exchanged for a black pall from Tromsö Cathedral. Then the chest was lifted from its place by the sealers of the *Bratvaag*—a group of young men with weather-beaten faces, bare-headed, their blond hair bleached by the summer sun. A black line becomes visible down by the edge of the quay. The line rises slowly and there stand the sealers with their burden on solid earth. All heads are uncovered and everything is movingly silent. Close by, the hearse is awaiting them and behind it moves in procession the waiting crowd along the mile of road that leads to the Coast Hospital. Nearest to the hearse walk the crew of the *Bratvaag* and the relatives of the two dead men, and by eleven the procession has reached its destination.

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[1] Archipelago.—*Trans.*

It was arranged that at one o'clock the *Bratvaag* should go to the customs wharf below the Coast Hospital in order to put on shore the objects found. At the same time, the doctors were to begin their examination of the dead. The boat with its cargo and the sledges were carried up to the place where they were to be inspected. After consultation with the crew of the *Bratvaag* everything was taken out that they had put into it themselves, after which the boat was photographed with the contents it had when it was taken out of the ice on White Island. Meanwhile, the chest containing the remains of the two men had been opened and now they lay, each on an operation-board in the large sick-ward. On the inside of the coat of one of them could be seen an embroidered A.; the underclothing of the other was marked N.S. They were wearing the same clothes as when they left Dane Island on July 11, 1897—a suit of blue cloth, heavy Lapp boots, and puttees. As regards Strindberg, especially, his Lapp boots were clearly the same as those he had put on that morning in July in place of the ordinary boots he had hitherto worn.

It was true, then, that the *Bratvaag* had found Andrée's camp. But the reality was, if possible, more unreal than the uncertainty of expectation. These poor remains, with the clothing stained by algæ and with green tufts of moss in the creases of the stiff army-cloth, were in fact all that was left of the bearers of two names which, for a few short months thirty-three years ago, had filled a whole world with excitement. It was Andrée and Strindberg who had been thus restored to the world after their long sleep amid the ice of White Island.

Andrée's remains were the first to be examined. When the jacket covering the upper portion of the body was removed, it proved to have concealed little more than a number of fragments of clothing, rags of underclothing, of a blanket, of gloves and stockings, some of which appeared never to have been worn, a couple of caps, etc. It was only the lower extremities that had been untouched; very little indeed remained of the other parts of the skeleton. As for the remnants of clothing, they had been found strewn about, but had been picked up, placed together, and covered by the jacket. A number of interesting finds were made among the clothes. Here lay one of the two Kullberg chronometers, and, attached to it, a gold chain with a locket containing photographs of Andrée's father and mother. The chronometer Strindberg had carried was also found in Andrée's clothes, together with a little purse of black leather containing a number of small objects which had belonged to Strindberg. One was a gold heart with his fiancée's portrait and a lock of hair. The great find, however, was the diary. At a point approximately corresponding to the waist there lay a knitted blue woollen jersey rolled together, in which something was wrapped. The doctors at once guessed that it contained some document. The first thing they touched was a bundle of wet grass, senne-grass as it is called, which in northern Scandinavia is used to put inside the Lapp boots and takes the place of thick woollen stockings. The first book opened was a disappointment. The pages were blank, although it afterwards turned out that one or two sides at the beginning contained some notes respecting observations. These, however, had been made before the balloon journey started. Great excitement prevailed when the second book was examined.

Here there was writing. It had been done with a lead pencil and was quite legible. It was with the greatest surprise that we found the book to be written in from cover to cover, and the memoranda to have been continued to the beginning of October. The official report communicated to the press the following day said that "this book, for the present, and probably in the future, will be the chief documentary source of what we can learn respecting the fate of the expedition." This utterance has since proved to be correct. We all felt that it was an historical moment when, in a ward of the Coast Hospital at Tromsö, we had brought to the light of day the chronicle of Andrée's Polar Expedition from the place where it had lain hidden for thirty-three years.

The next question was: what steps were to be taken to preserve the book. The paper was wet through and the leaves stuck together again as soon as the book was closed once more. If the drying continued in ever so slight a degree, there was a danger of the leaves becoming attached to each other so firmly that the pencil-writing might be damaged, or even entirely destroyed, when a fresh attempt was made to open the book. Another troublesome circumstance was that the first pages were already much damaged by mould, which had a good soil in the glue of the covers. The way in which the book had been wrapped up had also led to a thick growth of mould along its outer edges, which already made it difficult to separate the leaves one from the other. There was only one thing to do, and that was to open the book, leaf by leaf, the very same night, even if the work lasted until the following morning. However, the task was finished by midnight and blotting-paper had been inserted between the pages. After nearly twelve hours of uninterrupted labour, the members of the Commission were able to go to their rest with a quiet conscience. During the days that followed, the pieces of blotting-paper were constantly renewed, and when at last the book was quite dry, the blotting-paper was replaced with tissue paper in order to prevent the pencil-marks from being rubbed out.

The method of procedure was a very simple one but perfectly satisfactory.

The next day, September 3, saw the conclusion of the examination of Andrée's and Strindberg's remains. Simultaneously, their clothing had also been submitted to preparatory measures of preservation. The condition of the outer clothing has already been mentioned, and it may be further noted that it was highly impregnated with fine sand. The underclothing had also to be released from the soft parts of the dead bodies, not a little of which was still present. The method of preservation was as follows: the clothes were at once rinsed free from all external particles, after which, for the purpose of disinfection, they were placed in a bath of very dilute formaline. After being slowly dried for some days, they were put into a hot room in the hospital, and were then ready to be packed up. It was later found, on the arrival of the clothing in Stockholm, after a voyage of three weeks on board the *Svensksund,* that they had not undergone any kind of change, and that the underclothing of the dead men was as soft as on the day it had come from the wash.

When this work was over, attention was directed to the boat. The examination of the objects it contained resembled somewhat an archæological excavation. First of all a plan was drawn showing the objects that first became visible. After these had been numbered and removed, a similar plan was drawn of the next layer of objects. It was not until the third plan was made that the bottom of the boat was reached. In this way it becomes possible to reconstruct the position of the boat's load in detail. The boat was thereupon made free from sand and particles of humus. When the loose grating at the bottom was lifted up there were found some more fragmentary objects which had slipped through from the load above. The only process for preserving purposes to which all these objects were submitted was a thorough brushing away of all moisture and impurities. A parcel of books, maps, and charts lay in the afterpart of the boat. These articles were opened as far as was possible and then dried between sheets of blotting-paper.

When the examination of the remains of the two men was concluded, they were deposited in the coffins brought from Stockholm, zinc coffins within an outer casket of oak. Fate unexpectedly brought about the coincidence that it was on Strindberg's birthday, September 4, that the blue-and-yellow flag of Sweden was spread above his earthly remains and those of Andrée. The packing of the articles which had been found was almost entirely finished by Saturday, September 6. The Swedish vessel *Svensksund,* the same ship which, in 1897, had carried Andrée and his comrades to Spitsbergen, had been ordered to bring the relics of the expedition from Tromsö home to Stockholm. The *Svensksund* arriving very early on Sunday morning, everything was now ready to begin the journey home. The start had been fixed for Monday evening, immediately after the conclusion of the memorial service which was then to be held in Tromsö Cathedral.

But during the forenoon of Sunday there came a fresh, sensational message from the Polar Sea. A press combination consisting of the Hearst newspapers, a Stockholm journal, *Dagens Nyheter,* and an Oslo newspaper, *Tidens Tegn,* as principals, had hired a Tromsö vessel, the *Isbjörn,* to start for White Island, with Knut Stubbendorff on board as the leader of this expedition. The ship left Tromsö in August and arrived at White Island on a Friday in the beginning of September. After a two days' examination of the spot, Stubbendorff was able to communicate that he had made fresh, important finds which perfectly supplemented and completed those which had been brought home by the *Bratvaag.* What had happened now was nothing less than the discovery of the remains of Frænkel, the third partner in the expedition, together with other fragments of a skeleton which, judging from all appearances, were part of Andrée's body. In addition there had been found more written communications respecting the fate of the expedition. Finally, it became clear that during the month which had passed since the visit of the *Bratvaag,* a number of objects forming part of the equipment had come to the surface from the thawing of the ice. A new thrill of excitement was felt throughout the world, and once again it was Tromsö—"the capital of the Polar Sea," as the place had once upon a time been christened—that received the first, intense shock of it.

It was just when the scientific Commission had assembled for its last official meeting that the news was brought of the new find by representatives of the three newspapers just mentioned.

But what was to be done? Everything was in readiness for the departure of the *Svensksund,* and every preparation had been made for the solemn memorial service, at five o'clock on Monday afternoon. Moreover, the *Isbjörn* had suffered such an injury to one of its engines, as made it impossible to prophesy when it could be expected in harbour. On Monday forenoon, the Commission, together with the *Michael Sars* and the *Svensksund,* was requested to remain in Tromsö until the arrival of the *Isbjörn,* a request which was confirmed the following day by telegraphic orders from the Government. The civic authorities, however, were unanimous in desiring that the memorial service should take place at the time fixed.

Among the many recollections of those historical September days in Tromsö, 1930, that of the memorial service in the cathedral will perhaps be the most lasting. It is true that in the choir there stood only two coffins, Andrée's and Strindberg's, but we now knew that in a few days Frænkel's would be joined to them. The service, too, was "in memory of the Swedish polar explorers, S. A. Andrée, Nils Strindberg, and K. Frænkel." Tongues of fire from innumerable torches flickered around the altar, which was adorned with a wealth of flowers. The coffins were covered with the Swedish flag, and above them hung Norwegian and Swedish flags at half-mast. Beside each coffin there stood two guards of honour from among the officers of the *Michael Sars,* and down the nave of the church Norwegian seamen stood rigidly and silently at attention. On each side of the nave were seated the relatives of the dead men and those invited to the ceremony, while the galleries and the lower portion of the church were crowded to excess. Arrangements had been made for those who were unable to obtain admittance by placing loud-speakers in the neighbouring houses, where multitudes stood listening with the greatest attention.

The sermon preached by Dean Nissen was based on the Bible text which speaks of the sea that gives back its dead. Now the terrifying, yet mysteriously enticing Polar Sea had given back to us the men who had once left Tromsö, the last outpost of civilization. Many had said that it was a "madman's journey" to travel over the ice northwards in a balloon. It is possible that these men had been urged by some slight touch of human vanity, but nearest their hearts was an idealistic craving to explore a world. They were the first who had endeavoured to penetrate the regions of the Arctic through the air. Others had succeeded them with better results, but if no one had ventured to take this first, dangerous step, these later results would never have been obtained. Sweden could be proud to claim these three men who had not quailed before their task. The Dean's touching sermon dealt with the secrets and the dangers of the Polar Sea, and it may easily be imagined that its deepest echoes came from Tromsö's own people; from the young, whose longing was awakened and drawn to adventures far up amid the ice; from the old, grey-haired veterans of the Arctic waters who had spent the days of their strength there, where so many of their comrades had found a last resting-place.

The divine service was ended. The sailors of the *Michael Sars* fell in on both sides of the two coffins. But from the organ-loft there still floated the tones of Stenhammar's grand hymn:

"Sweden, Sweden, Sweden, native land!
My land of longing! My earthly dwelling!"

Then the coffins were lifted and borne to a side-chapel in the church, there to await the hour when the comradeship of the three men should once more be restored—the comradeship interrupted that day so long ago when Strindberg was buried by Frænkel and Andrée.

During the week which followed, Tromsö gradually resumed its everyday appearance. The foreign journalists had disappeared, leaving the representatives of *Dagens Nyheter* and of *Tidens Tegn* as victors of the field. The Commission spent their time hearing the official accounts given by the crew of the *Bratvaag* and in drawing up the reports and the minutes of their investigations. Daily reports no longer came from Tromsö, but from the *Isbjörn,* which was steaming towards the Norwegian coast with only one good cylinder.

On the Monday afternoon of September 15 news came, however, that the *Isbjörn* had put into a Norwegian harbour and anchored at Skogvik, about thirty nautical miles from Tromsö. Later on it was stated that the vessel might be expected at Tromsö at ten the following morning. At seven on Tuesday morning, the *Svensksund* and the *Michael Sars* lifted anchor and steamed off together, northwards through Tromsö Sound, to meet the *Isbjörn.* The meeting took place at 7.30. All flags were at half-mast; the officers and crews lined the decks, and, escorted by the two naval vessels, the *Isbjörn* entered Tromsö harbour at nine o'clock. The *Svensksund* moored at the quay. The *Isbjörn,* attended by the *Michael Sars,* went on to the Nemak pier close by the Coast Hospital, where it anchored at 9.20 a.m.

But there was no longer the same glorious autumn weather that had prevailed when the *Bratvaag* came; the night-mist had turned into a splashing rain. But along the quay there once more stood waiting the civic dignitaries, the members of the Commission, and a large number of the inhabitants of Tromsö. At ten o'clock the *Isbjörn* moored by the pier. This, then, was Frænkel's homecoming. Once more a sombre burden was borne by the strong sons of the Polar Sea to Tromsö strand, while the men of the *Michael Sars* and the *Svensksund* formed a guard of honour and all heads were bared. On this occasion it was the *Isbjörn's* people who went immediately after the hearse on its journey to the Coast Hospital.

The examination began at once. At the same time there were brought up the other finds that had been made by the *Isbjörn* at White Island, and these were now received by the Commission on behalf of the Swedish State.

The new examination did not occupy so much time as the first. Of Frænkel's body there remained only the upper part, which was dressed in the same clothes as in his lifetime; one piece of the underclothing was marked K.F. Besides this, more parts of Andrée's body had been found but they consisted exclusively of bare bones. The documents discovered had already been examined and preserved on board the *Isbjörn,* but the other finds did not form such a uniform whole as those discovered by the *Bratvaag* in the canvas boat. By September 18 a communication to the press was able to state that the examination was concluded. Andrée's coffin had been brought from the cathedral during the morning of September 17, in order to receive the parts of the body which had been newly found. These, as well as Frænkel's remains, were placed in their respective coffins on the eighteenth. The same day saw the conclusion of the packing of the finds and, simultaneously, there was begun the Maritime Court Inquiry with the crew of the *Isbjörn.* Early on September 19, Andrée's and Frænkel's coffins were carried to the cathedral, after which the other objects found by the *Isbjörn* were taken on board the *Svensksund.* The court concluded its examination, and everything was ready for the departure, which had been fixed for 5 p.m.

All day long every flag in the town and down at the harbour had flown at half-mast. As early as three o'clock great crowds had begun to fill the cathedral. At five o'clock the organ was heard to intone "The Last Journey," and the next moment the doors of the south aisle were thrown open. Andrée's coffin was borne by seamen from the *Svensksund* out to the hearse; then came the

THE "SVENSKSUND" ESCORTED BY FISHING-BOATS THROUGH ÖRESUND

THE "ISBJÖRN"

THE DISEMBARKATION FROM THE "SVENSKSUND" AT STOCKHOLM coffins of Strindberg and Frænkel, which were placed on open cars, covered with black cloth. The procession moved towards the harbour. First came a guard of honour from the *Michael Sars,* and after the coffins followed the scientific Commission, the officers of the *Svensksund* and the *Michael Sars,* the municipal authorities of Tromsö, and the members of the *Isbjörn* expedition. The Tromsö Orchestral Society, stationed at Prostnaeset, played Chopin's Funeral March; otherwise there prevailed a mute, solemn stillness among the many thousands of people who, with uncovered heads, followed the three men on their way to Swedish soil.

The three cars drew up at the *Svensksund's* gang-plank, between two crape-hung banners of the Tromsö Skippers Society. The officers of the *Svensksund,* the Commission, and the Swedish Consul went on board. Then Professor Lithberg came to the ship's side and gave the homecomers the first greetings from Sweden in the following words:

"It is but a few, poor remains which Sweden now receives of something which once filled the country, the whole world, with wondering enthusiasm.—When, on Tuesday, a fortnight ago, a rough-hewn wooden chest under a black cloth, and last Tuesday a second wooden chest under a faded Swedish flag, were brought on land at Tromsö, it was not the welcome home these men had expected!

"August Andrée, Nils Strindberg, Knut Frænkel! For one third of a century your ears have not heard the Swedish tongue. And now your senses can no longer catch what we say, be conscious of what we feel. But, though guests in another country, we have had permission to spread over your coffins the colours for which you went to meet death.

"In a few weeks the people of Sweden will receive you. Yet I may be permitted now, in the name of our native country, and, above all, in the name of the scientific Commission which you have honoured, and in the name of Swedish geographical research, to express in your presence the joy we feel that your own country is at last to receive your mangled remains.

"'Eagle' was the name you gave your vessel. But the Eagle was powerless to carry out its task. Many more men were to attempt, as unsuccessfully, that which the Eagle was unable to perform. And the more often these attempts are made, the more understandable, the more living, will become the picture of Andrée and his men. It is ideas, projects, dreams, that are foremost in carrying the world onwards, not so much their execution. During the weeks just past, the Old World and the New have listened breathlessly to the messages sent from Tromsö; today every Scandinavian heart beats as one at the remembrance of three heroic sons of the North. At this moment there is passed another milestone on that path of legend which shall recall to coming generations the memory of the exploration of the wide-spreading wastes around the Pole. Now, as so often before, it is Tromsö that is the point to which the eyes of the world are directed.

"In a few moments more, the dust of Andrée, Strindberg, and Frænkel will rest on a Swedish deck, to begin the journey through Norway's mighty land of fiords towards their last resting-place in the soil of their native country. The scene is shifted for the last phase of the journey of the Eagle. But a fresh Norwegian achievement has been inscribed in the annals of humanity.

"May I therefore be permitted, at this solemn moment when these remains are delivered to us, to express Sweden's thanks for the boundless chivalry with which Norway has made over to us a gift of such pre-eminent value.

"When I do so, it is a special honour to be able to address the city of Tromsö and its people. Tromsö's assistance in our labours has been magnificent, and the honour which, during these days, the city has shown to the memories of Andrée, Strindberg, and Frænkel will never be forgotten."

The coffins were lifted from the hearse by the men of the *Svensksund* and carried on board the vessel. First came Andrée's coffin, then Strindberg's, and last Frænkel's. The members of the Commission and the Swedish Consul bade them farewell; only Engineer Köhler accompanied the remains as the representative of the Commission. The next moment the *Svensksund* left the quay. The Swedish national anthem was played, and immediately afterwards the Norwegian anthem. On board the *Svensksund* and the *Michael Sars,* officers and men stood at attention. Then the *Michael Sars* left the harbour, in order to escort the *Svensksund* down the coast.

The solemnity was ended. The scene of the three men's journey had been changed, and the Commission and the last journalist left Tromsö by the south-bound express at eight o'clock in the evening.

When, three hours after leaving Tromsö, the *Svensksund* passed Gibostad, it approached the harbour with every light shining and with the search-light blazing at the foremast. Hundreds of people had assembled to greet the ship. An orchestra on land played the Swedish and Norwegian anthems, after which the vessel continued on its journey southwards. This was the first of the series of tributes of respect which was to accompany the *Svensksund* during the whole of her voyage to Stockholm. On Monday, September 22, the vessel passed Aalesund, from which place the *Bratvaag* hailed. At about half past eleven, the steamer *Norddalsfjord* left the quay at Aalesund in order to meet the *Svensksund.* With the *Norddalsfjord* leading her and the *Michael Sars* immediately in her wake, the *Svensksund* steered into the harbour, escorted by some twenty more vessels, the *Bratvaag* heading the procession on the starboard side. The flotilla passed the quay slowly. Here, as all along the shore, there were crowds of people, and every head was uncovered when the *Svensksund* passed. At Tuenæste Point the *Norddalsfjord,* the *Svensksund,* and the *Michael Sars* hove to, and then the procession of the vessels forming the cortège began. As each ship passed, it lowered the flag on its aftermast to the very bulwarks. After they had filed by, the *Michael Sars* also made her farewell, after which she returned to the quay at Aalesund. The church bells were ringing the whole time this solemn ceremony was being performed.

Early on Wednesday morning, bad weather compelled the *Svensksund* to seek shelter in Stavanger harbour. This incident became an historical episode as the Swedish vessel anchored alongside of Nansen's old ship, the *Fram,* which was on its way home to Oslo from the Exhibition in Trondhjem. The last time the two vessels had met was at Tromsö, in 1897, when Andrée was on his way to begin his polar flight. Official visits were paid on board. Wreaths were laid on the coffins, and in the evening the bells of Stavanger Cathedral rang the Swedish national anthem and other Swedish melodies.

On Thursday afternoon the *Svensksund* was able to leave Stavanger, and on Friday evening at ten o'clock it anchored at last in Sweden, at Gothenburg, in which city the reception was fixed for Saturday evening at 6.30. Some 75,000 people must have been gathered on and around the Masthugg Quay for the solemnities. Torches and cressets were the only sources of illumination. All the street-lamps had been put out, and no search-lights were allowed to play. Then the church-bells began to ring, and the *Svensksund* glided slowly up the river. The black gangway was run out and Lord Lieutenant von Sydow went on board to give Andrée's men the first words of welcome from their native country on their return home from their long journey.

He recalled the fact that it was from that very quay, and on board that vessel, they had begun their North Pole journey thirty-three years before. On that occasion the people of Gothenburg had sent them away with jubilant good wishes. Now the inhabitants of Gothenburg were gathered at the same place to greet their memories with a first, simple homage on Swedish soil. "At this moment," concluded the speaker, "I should like to recall some words that Andrée uttered at a farewell banquet given in his honour in this city: 'If we succeed,' said he, 'then I should like to tell you that, when we once more stand on solid earth and are able to say: now it is done! then our thoughts will fly here, where our expedition has been given so much essential help and where it has received such general sympathy. And if things should not turn out so well, then, at our last moment, our thoughts will fly back to Gothenburg and my thought, at least, will be: Oh, if only I could thank them once more!'

"Now it is to you, August Andrée, and to your achievement, that *our* thoughts are sent in grateful admiration; now it is we, Gothenburgers, who pay the Eagle's men our reverent homage."

After the Lord Lieutenant had laid his wreath on the coffins, Lieutenant-Colonel G. V. E. Svedenborg greeted his old companions with words of welcome from the participators in the Spitsbergen Expedition of 1897, and from Swedish aeronauts and flying-men. More wreaths were deposited around the coffins, and then the people sang, "Our God, He is our castle strong," after which the torch-bearers filed past the vessel to the tones of a solemn march. The *Svensksund* cast loose her moorings, laid off from the quay, and glided away into the darkness.

Öresund was passed on Monday. It was a veritable triumphal procession. North of the Sound there came to meet the *Svensksund* two vessels from Hälsingborg, Sweden, and the Danish naval ships, *Hvidebjörn* and *Argus*. On board the former were the Danish Prime Minister and the Finance Minister. Coming under Kronborg, the Danish flag was lowered to half-mast, all the bells of Helsingör (Elsinore) began to ring, and a funeral salute of fifteen guns thundered from the old castle. Then the *Svensksund* turned in to Hälsingborg, on the Swedish side, where words of welcome were spoken and wreaths laid on the coffins. Off Landskrona it was met by a whole fleet of vessels with new deputations and wreaths, and the course was turned towards Malmö. The Danish escort had now taken its farewell. Immediately north of Taarbaek there came another escort of nine

Danish aircraft, three hydroplanes and six destroyers, in wedge formation. They circled in vast arcs above the *Svensksund,* throwing down flowers and wreaths. A naval band played "Our God, He is our castle strong," and the *Hvidebjörn* gave a farewell salute of ten guns. The echo of the last shot died away. The noise of the aeroplanes sank into silence, and only as a whisper was there heard some moments longer the music of the band, like a trembling, tender tone borne across the waters. The Danish vessels sailed away towards Copenhagen.

The *Svensksund* was still headed for Malmö and, on its arrival, there came on board representatives of the towns of Malmö and Lund, of learned societies, and of the Undergraduates' Corps of the University of Lund. Now came fresh greetings, with convoys of ships, with wreaths, and with the songs of the students. Here came, too, a German aeroplane, which threw down a wreath from Deutsche Lufthansa. Then the *Svensksund's* course was turned southwards again but, under Limhamn, there came a new and unexpected greeting, in the form of a flotilla of more than fifty fishing-boats which approached, each with its flag at half-mast. The fleet arranged itself on both sides of the *Svensksund.* In the van came a couple of boats on which were hoisted the crape-hung banners beneath which the Limhamn fishermen follow their comrades to the grave. A tug-boat brought representatives to the *Svensksund,* who laid wreaths, from Limhamn harbour and from the fisher population, at the foot of the coffins. When the *Svensksund* had reached the southern mouth of the Sound, there came representatives of the towns of Skanör and Falsterbo, and when this escort left, boats came from Trelleborg to welcome Andrée's men.

At one o'clock in the afternoon of September 30, the *Svensksund* put in at Karlskrona. Here it was to lie until Thursday afternoon when it would leave for Stockholm, where the reception was arranged to take place on Sunday, October 5. As the vessel steamed into Karlskrona it was escorted by three aeroplanes. In the harbour, deputations came with their welcomes and their wreaths. And so the journey went on northwards from Karlskrona, and from Kalmar, Oskarshamn, and Nynäshamn came greetings as each town was passed.

At 6.30 on Sunday morning the *Svensksund* arrived at Dalarö, in the Stockholm skerries, now escorted by the destroyers *Ehrensköld* and *Hugin.* In spite of the early hour, the entire community was afoot. All flags were flying at half-mast. Representatives of the place went out to the *Svensksund* in pilot-boats and saluted the homecoming travellers. Finally the *Svensksund* moved slowly on towards Stockholm.

The crowd of motor-boats that has gone to meet it grows larger and larger until it numbers between one and two hundred. At the Fjäderholm Islands there comes to meet the vessel a flying-squadron of five look-out aeroplanes and three destroyers, which afterwards circle above the ship the whole way up the "Stream." Three steamers fall into line behind the flotilla, and on the stroke of two the *Svensksund* is moored to the quay at Skeppsholmen in Stockholm.

The way the procession was to follow from Skeppsholmen to the Great Church—St. Nicholas's—of Stockholm, where the burial service was to take place, was marked out by flag-staffs, whose colours drooped heavily at half-mast amid the rain-filled mist which had hung over Stockholm the whole morning. While the relatives of the home-comers, and the representatives of the corporations that were to take part in the procession, assembled on the quay-steps at Skeppsholmen, the mist was transformed into a pelting rain. At right angles to the quay-steps there had been laid a pontoon-pier, some fifty yards in length, carpeted in black, and with festoons of spruce and of blue-and-yellow ribbon. Farthest out, the pier was provided with a high platform arranged to lie on a level with the boat-deck of the *Svensksund.* By the quay-steps stood King Gustaf, surrounded by his staff, and next came the places of the relatives of Andrée's men. A song rose, and, amid the ringing of the bells of every church in the city, the coffins were carried from the ship by the seamen of the *Svensksund* and laid before the feet of the King, who welcomed the heroes to Swedish soil in the following words:

"In the name of the Swedish nation I here greet the dust of the polar explorers who, more than three decades ago, left their native land to find an answer to questions of unparalleled difficulty. They went away—they vanished into the horizon. Their own fate but increased the number of the problems. And yet, they have come home again at last!

"The country's hope, to be able to honour them in their life-time after a successful journey, was disappointed. We must submit to the tragic result. All that is left us is to express our warm thanks to them for their self-sacrifice in the service of science.

"Peace to their memory!"

After a funeral salute of ten guns had thundered, the procession began to move towards the cathedral, the coffins resting in three open cars. Along the whole way, there stood a guard of honour composed of various corporations, and tens of thousands braved the unkindly powers of the weather to give, with uncovered heads, a last, silent salute to the wanderers who had reached home at last. The Palace Hill was bordered by members of the Socialistic Trades Unions, grouped beneath their red standards. The choir of the church was richly adorned with flowers, and a white cross of blossoms rose beside each of the three catafalques on which the coffins were to lie. The king and other members of the royal family occupied the "coronation-seats" on each side.

The burial service was performed by Dr. Widner, the Dean, and, after a hymn had been sung by the choir, Archbishop Nathan Söderblom went into the pulpit.

"Welcome home!" were his first words. "Welcome, Andrée! Welcome, Strindberg! Welcome, Frænkel! You have been many years away. And what we now receive are merely the ruins of magnificent, well-tempered instruments fitted for indomitable longing and clear-sighted achievement." In brief, distinct phrases, the Archbishop sketched the characteristics of the journey and the congregation listened breathlessly to Andrée's remarkable words from the diary, recovered after thirty-three years from the ice of White Island. They are the words written in the car of the balloon: "We think we can well face Death, having done what we have done." And the speaker concluded: "When, after millions of years to come, our rolling globe shall, perhaps, tell to dumb worlds the legend of the passing amid icy cold of our vanished race, will, then, the story of the end of the last man resemble that which has made your memory glorious? All that which passes is merely semblance. From semblance reality comes forth at last! The veil falls. The spirit lives. Jesus said: God is the God of the living. Amen."

Singing. Fresh wreaths are laid beside the coffins. The solemnity in the church is ended.

At eight in the evening, there was held the great memorial celebration in the City Hall of Stockholm. Professor Gerhard de Geer spoke, giving an account of the planning and of the scientific results of the expedition. Bishop Stadener, the Ecclesiastical Minister, on behalf of the Swedish nation, thanked the men whose various labours had brought home the polar travellers, and the relics of the expedition. The speech took the form of an expression of thanks to Norway. Then E. A. Karlfeldt, the Secretary of the Swedish Academy, spoke on "Andrée and National Feeling." He gave a rapid sketch of the three men, dwelling especially on Andrée's richly faceted personality. The speaker offered a pregnant perspective of progress when he said, among other things: "Andrée and his men left Stockholm one day during the glorious Jubilee and Exhibition summer, 1897. Their fate has been revealed during the equally brilliant Exhibition summer in 1930. Much has happened between these two years. Supposing that Andrée had now returned alive, he would find his firm confidence in science and technology glorified by inventions and discoveries of which he would never have dared to dream. His poor weak-winged, broken-pinioned 'Eagle' has been succeeded by giant vessels with strength of another character, fitted to brave the elements. His errant carrier pigeon has been replaced by speaking waves, carrying messages unintermediated through the heavens for almost unlimited distances. All this gives rise to a certain profound melancholy in this day's celebration, even if we remember that Andrée was the first to trace that path, a pioneer, a harbinger carrying the first fulfilment of the promise: They shall fly like eagles and shall not be weary."

The memorial celebration in the Blue Hall of Stockholm's City Hall was a solemnity of a unique character. The memory that was being celebrated seemed to lie so far in the past as to give a sense of unreality, and then one's thought would turn to the three coffins which had that day been brought back to Swedish soil, and which still stood, adorned with fresh flowers, in a side-chapel of the Great Church.

The coffins were allowed to remain in the church a few days more, in order to afford an opportunity to those who wished to do so, to greet for the last time the three polar heroes. On Thursday, October 9, the bodies were borne to the crematorium, where, after a short ceremony, the coffins sank to meet the fire—first Andrée's, then Strindberg's, and, last of all Frænkel's.

The three men's story was ended.

Part Four

THE VERDICT OF SCIENCE

The Balloon and Its Construction

By Lt.-Col. G. V. E. Svedenborg

The Eagle was manufactured by Henri Lachambre of Paris, under the strictest supervision of the Swedish engineer Per Nordenfelt, and others. It then had a spherical form. During the winter of 1896–1897, the balloon was increased in capacity by the addition of two zones placed one on each side of "the equator." When, therefore, it made the ascent in 1897, the balloon was somewhat elliptical in form with a capacity of 170,000 cubic feet.

The upper portion was made of three-ply Chinese silk of the best quality, and the lower part was constructed of double silk of the same kind. The seams were sewn with silk and were covered, both inside and out, with strips of single silk glued fast to the balloon. The upper, three-ply silk was varnished twice on either side. The lower part was varnished once on the interior and twice on the exterior. To the lower part of the balloon there were sewn fast strips of cloth, both inside and out, for the purpose of carrying off water.

The balloon was not provided with a top-valve and, in this respect, probably differed from all other balloons provided with valves. It had, instead, two manœuvring valves, arranged at different heights near the equator, and worked by means of lines. When the balloon did not contain more gas than that above the upper valve, it could not remain floating in the air. In addition there was a bottom-valve closing automatically.

All these valves were too small to allow of the rapid escape of large quantities of gas, which would be necessary when landing. The balloon was, therefore, provided with a "bursting" arrangement (rip-valves) which made it possible to tear asunder the balloon-covering. The filling-hose for gas was attached on the lee side of the covering. After the balloon had ascended, this hose indicated the degree of over-pressure in the balloon by its distension.

Above the balloon there was placed a net of Italian hemp, which had been soaked in acid-free vaseline to prevent it from absorbing water. At the bottom, the net ended in forty-eight carrying-lines which held up the bearing-ring.

To keep moisture and hoarfrost from settling in the flat panels formed by the meshes of the net, the upper part of the polar balloon was covered with a calotte, a sort of cap or hood, outside the net. This calotte was made of single, varnished silk. Where drag-lines (guide-ropes) are employed on a balloon, the calotte is especially effective, for the balloon constantly receives slight shocks or jerks from the earth or water, and these serve to dislodge accumulated snow from the calotte. The calotte is also an insulator of heat, preventing the cooling or over-heating of the gas.

The car (gondola or basket) was plaited of wicker and Spanish cane, and was covered with a tarpaulin. It had the shape of a closed cylinder. An opening by the edge of the slightly arched roof gave admission to the interior of the car. The interior formed a single room in which the belongings of the expedition were kept, and where three berths were made up.

The car was attached to the bearing-ring by means of six heavy ropes. In the intervals between these lines there were attached pieces of cloth which, all together, formed the so-called "skirt," the object of which was to afford protection against wind and to prevent the aeronauts and any loose articles which happened to be on the roof of the car from falling overboard. Inside and out, the "skirt" was provided with a number of pockets for instruments and smaller tools. At the height of the eyes of those who were standing on the car-roof there was suspended elastically an instrument-ring, on which were arranged the expedition's instruments.

A rope-ladder led from the roof of the car up to the bearing-ring, the upper side of which could be reached by a hatch-covered hole in the roof. In the bearing-ring there were arranged baskets and hanging pockets of cloth which contained most of the belongings of the expedition, the provisions especially. To the bearing-ring, too, which was of very strong construction, there was attached a system of drag-lines.

The drag-lines (guide-ropes) and the ballast-lines (i.e., ballast in the shape of ropes) were intended, in the first place, to keep the balloon at a fairly constant height above the surface of the earth.

If a balloon becomes a little wet, or cooled some degrees below its normal temperature, it soon grows "unwilling and tired," that is, it loses some of its buoyancy. But the lower the balloon then sinks, the more of its drag-lines will come to rest on the earth and hence the less the weight actually carried by the balloon. This compensation will keep the balloon from falling too low. On the other hand, if the buoyance is increased, as for instance by the action of sunlight on the gas, more drag-line is raised from the earth, and the balloon is made to carry a heavier weight.

The total length of all the drag-lines together was 1100 yards and their weight 1600 pounds. At a normal height of the balloon (i.e. about 160 yards above the ice), 680 yards of drag-line, weighing 990 pounds, would be suspended in the air and 420 yards, weighing 610 pounds, would drag along "the ground." These drag-lines or guide-ropes were three in number. To prevent them becoming entangled with each other they had been made of varying lengths. For the purpose of more certainly avoiding the danger which might arise should the balloon descend suddenly, there were attached to the balloon eight ballast-lines, 77 yards long, which hung freely suspended. These, when the height of the balloon above the surface of the earth became less than 77 yards, began to act in the same way as the drag-lines. As the total weight of all these ballast-lines was 880 pounds, and as 990 pounds of the drag-lines hung in the air, the balloon, consequently, could lose as much as about 1800 pounds of its carrying-power before the car touched the earth.

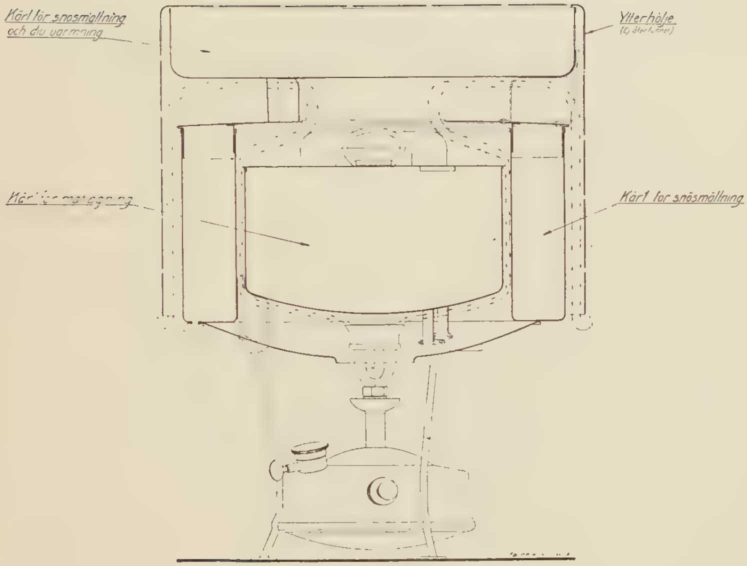
Each drag-line consisted of an upper portion of hemp and a lower section of coco-nut fibre. Each of the coco-nut fibre lines was provided, at a distance of 55 yards from the lowest end, with a slenderer part, or neck, intended to make the line weakest at that point. If the line should catch fast in anything, it would then break off just there, and not hold the balloon fast. But since each line had only one "weak point," the balloon might still be held fast if a line, which had already once broken at the weak point, were again caught. To be able, in such a case, to release the balloon without having to cut free the entire line, there had been arranged, at the point of junction between the hemp and the coco-nut fibre, a threaded section which could be unscrewed by twisting the rope. This twisting was done with the help of a special mechanism close by the balloon, which possessed a powerful gearing. When, on the start from Dane Island, these threads had come unscrewed because of kinks in the lines and because some of the lines had probably caught on a stone, there was the same sort of torsion in the stretched ropes which the above mechanism would have produced, and with the same result.

But the drag-lines had another task besides that of keeping the balloon at an equable altitude, for it was by means of them that the steering of the balloon was to be done. Andrée's own description of the steering arrangement is as follows:

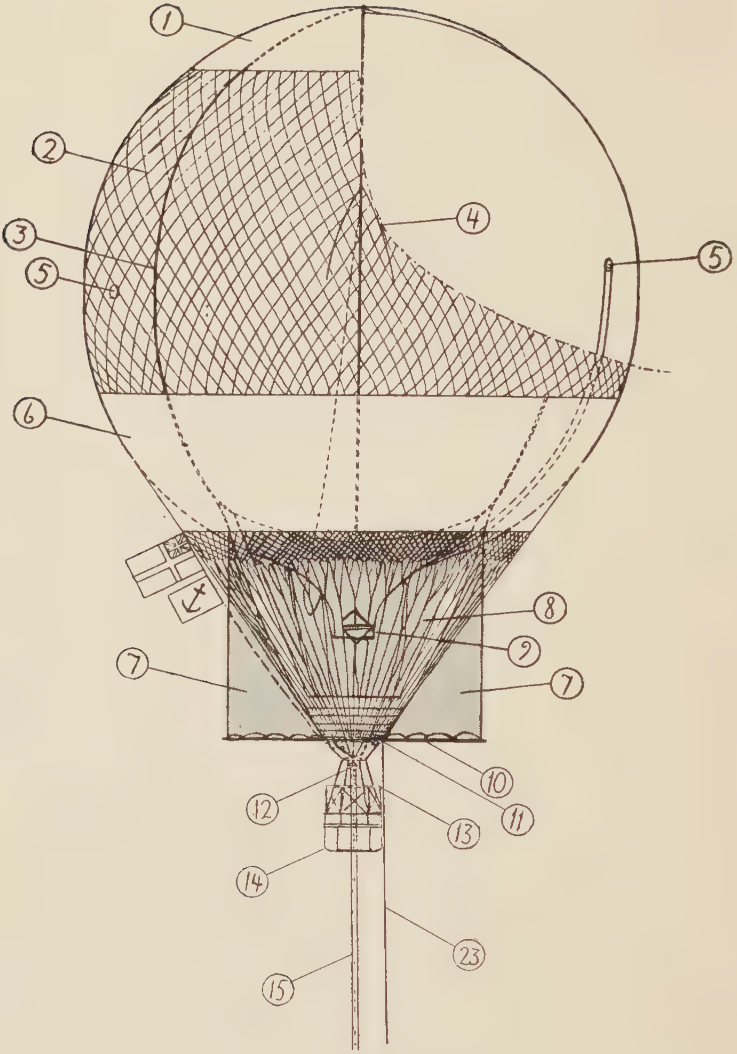
"A balloon floating perfectly free in a current of air moves in exactly the same direction and at precisely the same speed as the current of air. This agreement between the current of air and the movement of the balloon makes it useless to provide the balloon with such accessories as sails, rudder, etc. To make a balloon deviate from the direction of the wind it will, therefore, be necessary to procure for the balloon another speed, either greater or less than that of the wind. If it were possible to give the balloon a greater speed than the wind's, it could be steered in all possible directions, even right against the wind. But if the balloon can only be given a smaller speed than the wind's, then it cannot be steered against the wind, but it may be made to deviate more or less from the direction of the current of air. For it is evident that, if a balloon which moves slower than the wind were provided with a sail aslant the direction of the wind, then the wind would force the balloon along in a direction at an angle to its own course, just as it does with a sailing boat, and it is clear that, by altering the position of the sail, it would be possible to bring about modifications in the amount and direction of this deviation. It is, thus, clear that, if a balloon were provided both with sails and with heavy guide-ropes, which latter prevent the balloon from moving as fast as the wind, it would be possible to steer it within certain limits. But this steering will not be made effective—as is done with sailing boats—by setting the sail in a certain position to the wind; such arrangements will be made, instead, which will allow the entire *balloon* to be rotated around its vertical axis, whereby the sail will present itself to the wind at varying angles."

This rotation of the balloon was regulated by means of lines and pulleys, which moved the guide-ropes to the one side or the other of the central position, i.e., the position the balloon assumes when it is running right before the wind. The system of sails attached to the balloon will of course partake of this rotation, and will then assume an oblique position in relation to the wind. The amount of deviation thus obtainable depends on a number of circumstances, such as the friction of the drag-lines, the velocity of the wind, the size of the sail in proportion to that of the balloon, etc.

Andrée's polar balloon carried three sails, one central and two lateral. The central sail was set up just below the gas-bag in the space between the carrying-lines and the bearing-ring. The lateral sails were ar-


Kärl för snösmältning
och div värmning
Ytterhölje
(Ej återlämnat)
Kärl för matlagning
Kärl för snösmältning

COOK-STOVE OF THE EXPEDITION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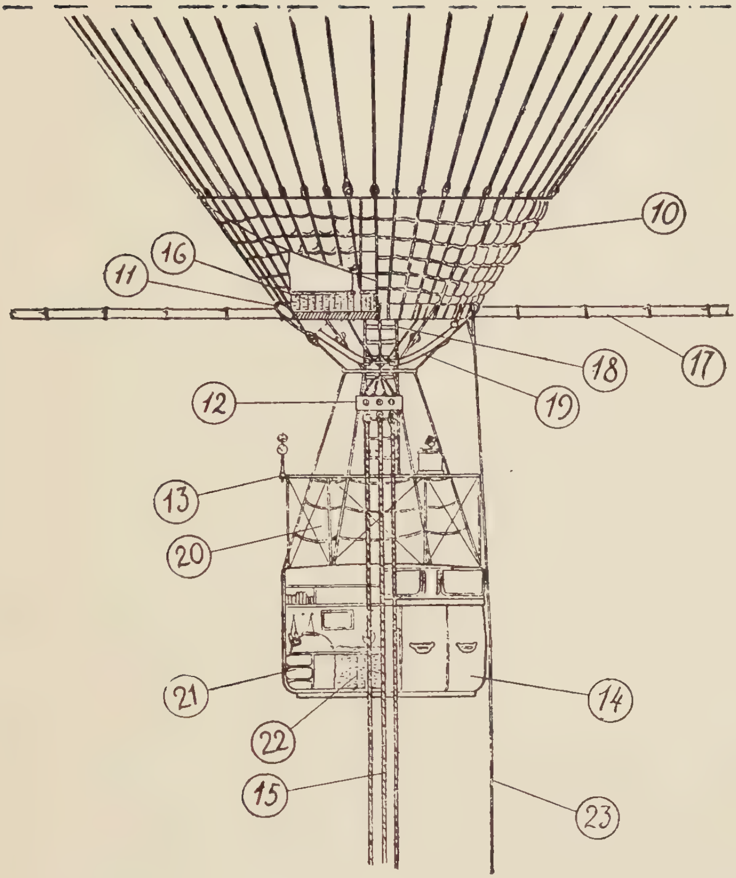
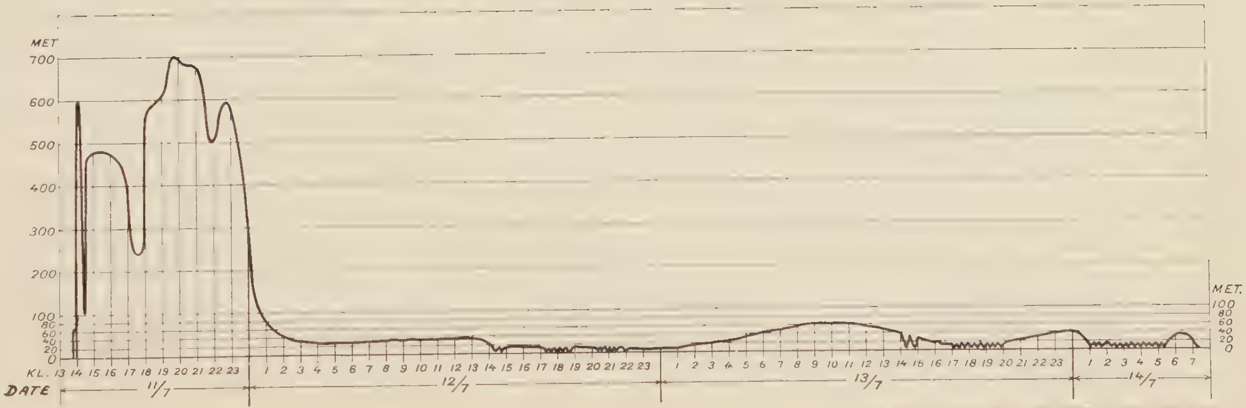
ANDRÉE'S POLAR BALLOON

On the basis of Andrée's designs and descriptions. On the page opposite are the car and lower part of the balloon, with an identification of detail. The left half of the car is a sectional view.



1. Calotte.
2. Net.
3. Bearing-line for sail.
4. Bursting apparatus.
5. Manœuvring-valve.
6. Belly-band.
7. Side-sail.
8. Centre-sail.
9. Bottom-valve.
10. Pockets in the bearing-ring.
11. Bearing-ring.
12. Winch for unscrewing drag-lines.
13. Instrument-ring.
14. Gondola (car).
15. Drag-lines.
16. Provision basket in bearing-ring.
17. Bamboo pole for fastening side-sails.
18. Rope-ladder between roof of car and bearing-ring.
19. Tackle for manœuvring drag-lines.
20. "Skirt."
21. Provision basket in the car.
22. Berths.
23. Ballast-lines.



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HEIGHT IN METRES ABOVE SEA LEVEL OF THE BALLOON DURING ITS FLIGHT ranged on either side of the central sail and on the same plane, but outside the carrying-lines. The entire sail-area amounted to no less than 818 square feet, or nearly one-fourth of the great-circle area of the balloon. During the experimental steerings of the balloon Svea, the sail-area had been one-eighth of the great-circle surface, and even then Andrée succeeded in obtaining a deviation of almost 30° from the direction of the wind. The dirigibility of the polar balloon ought consequently to have been considerably greater than that of the Svea. The upper edge of the sails leaned backwards so that the pressure of the air would contribute to lift the balloon.

Below the equator of the balloon and on its leeward side, outside the net, there was arranged a broad girdle, the so-called "belly-band." The object of this was to protect the lower part of the balloon from the pressure of the air, for, during the course of his experiments with the Svea, Andrée had discovered that the pressed-in part acted as a sail, thereby affecting the steering of the balloon in a way that could not be controlled.

For landing purposes two anchors were taken along, each weighing 66 pounds, and three grapnels, varying in weight between 26 and 13 pounds, one of them belonging to the bursting arrangement.

At the start on July 11, there was also taken sand-ballast weighing about 700 pounds, in addition to which much extra ballast was present in the form of ammunition, necessaries of life, and instruments, taken in excess of the equipment absolutely necessary. Andrée considered that he might just as well take reserve equipment as sand, for, under certain circumstances, he might be able to utilize such reserves.

The provisions were calculated to last three and a half months—a month and a half in the balloon and two months on a sledge-journey. They were kept in boxes made of aluminum or thin plates of copper so designed that they could be conveniently placed within the aforementioned pockets in the bearing-ring. The total weight of all provisions amounted to about 1500 pounds, of which about 400 pounds consisted of water and spirits for cooking purposes, carried in aluminum vessels. In addition to the above supply of provisions there was also a reserve, so that, on its start, the expedition was provided with enough food and the like for a six months' voyage.

The danger of fire made the preparation of food on board a balloon filled with hydrogen gas a very difficult problem, but a friend of Andrée's, Ernst Göransson, C.E., succeeded in solving it in a most ingenious way. The cooking apparatus constructed by him hung 26 feet below the car, and was heated by a spirit-lamp which, by means of special devices, could be lit and extinguished from the car. A mirror, placed at an angle of 45° in front of an opening in the apparatus level with the flame, allowed the cook to see if the lighting had been successfully accomplished.

To give the outside world information as to the progress of the balloon flight, the expedition carried buoys and carrier-pigeons. The buoys consisted of balloon-shaped balls of cork, wound round with copper-netting, and containing a closed metal cylinder for a letter-box. Each such buoy weighed about 4½ pounds. It was intended that these buoys, twelve in number and carrying communications in the metal cylinder, should be thrown overboard at various places in order that they might drift with the ice or with ocean-currents until they were observed and picked up. One of the buoys (the "Pole-buoy") was larger than the others; this was to be thrown down at the northernmost point reached by the expedition.

The carrier-pigeons were presented to the expedition through the kindness of the *Aftonbladet,* a Stockholm evening paper. The pigeons carried dispatch-holders, in the shape of parchment cylinders fastened to the central tail-feather of the bird. The balloon carried thirty-six pigeons in small baskets made for the purpose.

In the event that the expedition might be compelled to land and make its way home across the ice, three sledges were taken. Moreover, a number of food depôts or caches were set out. At the starting-point, at Pike's House on Dane Island, there was placed a large supply, both of preserved provisions and of ammunition. A smaller depôt was made at the Seven Islands off the north coast of Spitsbergen. This was done through the kind assistance of Teodor Lerner in the little steamer *Express.* The position of this depôt was indicated by a mark easily observable from the north. Besides these, supplies of provisions, etc., were placed in Nordenskiöld's house at Mossel Bay, and an especially richly supplied depôt was made at Cape Flora, on Franz Joseph Land.

In order to protect the polar balloon from damage by weather and wind, not only while it was being filled with gas, but also during the time when the expedition was waiting for favourable winds, it was necessary to have a hangar or balloon-house. The construction of this was entrusted by Andrée to Ivar Svedberg, Chief Engineer. The task was carried out in a perfectly admirable way, the building being so constructed that the balloon, at the moment of starting, could leave the house rapidly and without injury, protected to the last minute against gusts of wind by a provisional, adjustable leeward-wall. The strength and solidity of this balloon-house are testified to by the way in which it bore up, almost without any damage, under the polar storms of the winter of 1896–1897, although such an eventuality had not been foreseen by the constructor. Both the erection of the building and its partial demolition when the start was made were carried out in perfect accordance with the calculations and without any difficulty at all.

The hydrogen-gas apparatus necessary for filling the balloon was constructed by Ernst Ek, C.E., in accordance with the directions given by Andrée. The gas was obtained by the action of sulphuric acid on iron shavings. The concentrated acid, which was transported from Stockholm in pressed-steel tanks, was first diluted with sea-water, after which it was allowed to act on the iron shavings in a special generating vessel. The gas thus obtained was washed, purified, and afterwards dried in special apparatus, and was then led through an observation box, provided with anemometer, thermometer, and a hair-hygrometer, into the balloon. At Spitsbergen, in 1897, there was generated during the eighty-six hours the apparatus was at work, a total of 182,000 cubic feet of gas, i.e., about 2120 cubic feet per hour. The generation of the gas went on quietly and without a hitch, and its quality was the best imaginable. The tests that were made, to a total of more than a hundred, showed not the slightest trace of free acid or hydrogen sulphide in the gas.

Every detail of the equipment was submitted to the most careful supervision on the part of Andrée. Now and then it happened that one of his friends would propose an alteration, but Andrée was always able to answer that he had already considered the eventuality and had made the necessary experiments in that connexion. Then he explained the reasons that had induced him to employ the detail which had been criticized.

Only in one instance did Andrée decide to follow advice that was given him, but he did so against his own conviction. It was in regard to the afore-mentioned screw-joints of the drag- or guide-ropes. He wrote of this: "The fear was expressed that the drag-lines would fasten in something, and that we should never get loose again. That danger formed the kernel of the objection, and it was the obstinacy with which the criticism was continued that induced me to construct the so-called 'screw-joints' or threaded splicings—an invention which, perhaps, is not without ingenuity, but which, in my own opinion, is altogether unnecessary, and has no other advantage than that it affords a certain sense of security." Had Andrée, in this instance, followed his own intentions, there would have been no screw-joints, and then he would have begun his journey at Dane Island in possession of his guide-ropes. Subsequent events demonstrated the importance this would have had for the course of the journey.

The Weather on the Flight

By A. Wallén

When we consider the great role that meteorological conditions must necessarily play in a flight to the Pole by balloon, we would expect to find such phenomena thoroughly discussed in the plan drawn up by Andrée for his Polar Expedition. And yet we find very little said about them there, the only weather factor on which any stress is laid being the direction of the wind. Of course this latter point was one of decisive importance for the aeronautics of that day, since the wind is the sole motive power of a free balloon.

A short account has been given, in the chapter entitled "Planning the Polar Flight," of the meteorological premises on which Andrée based his intended journey. As may be seen there, he considered the climatic conditions prevalent in the Arctic regions during the month of July as quite favourable for a balloon flight. However, he paid but scant attention to the existence of fog or of a nearly related phenomenon, namely, hoarfrost.

In the first, uncompleted expedition of 1896, one of the participators was a well-known Swedish meteorologist, Nils Ekholm. In 1895 Dr. Ekholm had published an account of his researches and studies on the weather conditions in that very part of the world which was later to be the scene of Andrée's expedition, and in many respects this account confirmed Andrée's observations.

Dr. Ekholm found that the tract between Spitsbergen and the North Pole lay just between an area of high atmospheric pressure in the east, and one of low atmospheric pressure in the west, and that this would lead to the prevalence of winds from the south. He points out, however, that the actual state of things is very variable, owing to the occurrence of wandering cyclones. If the ascent began when such a cyclone happened to make its appearance north-west of Spitsbergen, two possibilities presented themselves. On the one hand, the balloon might be carried by a southerly wind towards the Pole, which it would probably be forced to circle around several times. Afterwards it would be borne towards Siberia or Russia. On the other hand, the balloon might remain for a brief period in the neighbourhood of the high-pressure area and, by means of its sails or its steering arrangement, force its way into it. There was no danger of a calm of any duration capable of keeping the balloon imprisoned within inhospitable tracts, for the equilibrium of so extensive and capricious a high-pressure area was too easily disturbed.

As regards the question of fog, Ekholm had drawn the conclusion, from what was then known respecting this phenomenon, that it hardly appears more than a couple of times during the months of July and August in the regions lying north of Spitsbergen and Greenland.

Ekholm's theory of the role played by errant cyclones must, on the whole, be considered as in agreement with modern views, especially as regards the month of July. And later investigations concerning temperature and rainfall (= snow, mist, etc.) have, in the main, confirmed the opinions of Andrée and Ekholm. Later observations have shown, however, that fog is of very common occurrence between Spitsbergen and Franz Joseph Land and that, in the region between the latter and the Pole, fog usually prevails for more than twenty days during the month of July. Now, aeronautical polar expeditions in our day are in possession of better means than those employed by Andrée, and they are more independent of wind-conditions. Hence, fog has now become the prime consideration in such attempts, and it is a generally accepted rule that flights across the north polar tracts should not be undertaken later than in May or, if absolutely necessary, at the beginning of June. From a purely climatic point of view, April appears to be the best month, but even at this early period of the year fog, and the hoarfrost deposited by fog, have been fatal to polar flights. It must, therefore, be taken as certain that Andrée and Ekholm both underestimated the factor of fog and its consequences even for a balloon of their type. Nansen's telling characterization of the polar fog, applied to their attempt, too, as will be amply illustrated in the following pages. "Ugh!" said Nansen. "This infinitely tenacious Polar Sea fog! When it covers you with its mantle and hides from your eyes the blue above you and the blue around you and turns everything to a grey, wet mist, day in and day out, then there is required all the buoyancy of soul one possesses in order not to be depressed by its close embrace. There is fog and fog and nothing but fog wherever we turn our eyes. It rests on the rigging, and every patch of the deck is soaked by its dripping. It rests on one's clothes and at last wets them through. It lies on one's soul, it lies on one's senses, and everything becomes a greyness within a greyness." And these remarks were made on board a ship; how much truer must they have been for a balloon, engulfed and pressed to the ground by this wet covering!

The statements in Andrée's diary respecting the weather during the balloon flight are concerned above all with conditions of wind and temperature, those being, as we have seen, the chief factors. To judge by all appearances, the temperature was quite normal, and the very inconsiderable variations that occurred were typical of that polar region. The temperatures as shown by the dry-bulb thermometer varied very little—between 33.8° F. and 30.9° F. As a rule, the temperature remained about half a degree or so above freezing-point, and there is no trace of any great differences. The wet-bulb at first stayed about half a degree lower than the dry-bulb thermometer, but the difference gradually disappeared, and its figures were the same as, or even a little higher than, those of the dry-bulb. The relative moisture, consequently, had risen from 88% to 100%.

With a knowledge of the route taken by the balloon and the information given us by the diary and logbooks, we are able to obtain a more detailed and varied idea of the winds and weather that prevailed. At Virgo harbour, during the days immediately preceding the start, winds from the south were very common. It seems probable, however, that, just there, southerly winds appear locally to an abnormally great extent, just as they do, as a rule, along the western coast of the Spitsbergen archipelago. Taken as a whole, the wind conditions along the coasts of Spitsbergen are distinguished by the frequent occurrence of local winds, which often attain a considerable velocity, but which blow only within a limited tract. An example of this is given by the winds which blew on July 11, the day when the ascension was made. A Norwegian polar skipper, Johan Posti of Alten, who was with his sloop *Solblomsten* north of North-East Land, nearly in 81° N. lat. and about 20° 30′ E. long., entered in his logbook that an easterly storm prevailed, and that the same wind continued the following days until July 13. But, on the north-west coast of Spitsbergen on the eleventh there blew a southerly wind. Posti adds that he was fully aware that the easterly wind was of but a local character, and came from the icy fells of North-East Land. Edvard Johannesen, another Norwegian sealing-skipper who was north of Spitsbergen during the month of July, noted a south-easterly wind on July 11.

The very scanty notes of the party respecting the distribution of the atmospheric pressure in this neighbourhood during the days about

July 11 tell us very little indeed of this matter. Probably, however, there existed on the eleventh a not very pronounced low-pressure area west of Spitsbergen, while a fairly high atmospheric pressure spread across the tract lying between Jan Mayen Island, Bear Island, Spitsbergen, and Franz Joseph Land. Spitsbergen, and the sea immediately to the north of the archipelago, had a rising barometer, which meant that the weather was probably most influenced by this last-named factor. This, we may suppose, was also the origin of the rather heavy southerly wind that blew over Virgo harbour on July 11.

It was with this southerly wind that the Eagle started at 1.46 p.m. on July 11. The first stage lasted until, after a journey of almost two and a half hours, the travellers took their last bearings of land at 4.21 p.m. The wind had been the whole time south-west, often squally and with an average velocity of 29.3 feet per second. The sky was covered with clouds except towards the north-east and over Spitsbergen. The second stage lasted almost five hours, i.e., until 9.18 p.m., the wind the whole time blowing fresh from the south-west. Its average velocity was 42.9 feet per second but probably exceeded this figure considerably, now and then increasing, very likely, to more than 65 feet per second. The balloon moved at a considerable height (750–850 feet) so that this velocity need not have been impossible. Heavy clouds and fogs became more and more frequent but the balloon floated above them, where the sky was clear and sunshine prevailed.

The next stage lasted almost two hours and ended at 11.06 p.m. The wind had now swung round, becoming more westerly. The average direction was west-south-west. The velocity of the wind had diminished, but the mean rate was about 33.8 feet per second, in which connexion it should be observed that the height of the balloon was now lower, the mean being a little more than 625 feet. There was still a fairly dense layer of clouds, immediately above which the balloon moved, only occasionally catching glimpses of the ice beneath. During the following stage which lasted a little more than one and a half hours, or until 1.26 a.m. on July 12, the wind continued somewhat westerly or, rather, on an average, directly west. This alteration in the direction of the wind which had taken place during the evening must still have been the result of the high atmospheric pressure, which, as we have seen, prevailed there. The weather was, in general, cloudy and foggy near the surface of the earth, but as long as the balloonists were above the fog, they could see alto-cumulus clouds in the east. The balloon, however, soon sank to heights of less than 325 feet, thereby coming into the fog which prevented them from seeing any distance.

The wind, which had been falling greatly in strength, died away entirely during the night, and the next stage of the journey embraces a period of dead calm lasting almost one and a half hours, or until 3 a.m. The balloon was then in 82° 11′ N. lat. and 28° 15′ E. long. Gr. The fog continued and the field of vision was extremely limited. During the two short stages which immediately succeeded, and which did not occupy a longer total period than three hours, or until 5.58 a.m., there prevailed a very faint wind, which, during the first of these stages, was south-east with an average velocity of 4.5 feet per second, and during the second was a little stronger, with an average velocity of 7.2 feet per second.

Now and then the fog lightened somewhat, and after this second stage there was again a dead calm for nearly one hour, or until 6.40 a.m.

After this calm there followed a new, long stage, with a constant, almost easterly wind, and lasting for more than fifteen hours, i.e., until about 10 p.m., July 12. During this period the average velocity was 10.7 feet per second, and the balloon was carried almost 115 miles towards the west (15° 30′ E. long. Gr.). In this connexion we must first investigate to what extent the distribution of the general barometrical pressure had altered during this period. At Green Harbour, the barometer fell rapidly from 8 p.m. on July 11, when it stood at 29.718 inches, until 8 a.m. on July 12, when its height was 29.28 inches, after which it probably rose again somewhat during the course of the day, until at 8 p. m., at Advent Bay, it stood at 29.297 inches. The lowest atmospheric pressure was probably reached during the course of the day when, at Virgo harbour, there was a dead calm at noon, succeeded in the evening by a faint wind from the west-south-west. It seems probable to me that a uniform low-pressure area, open to the north, had moved on towards the north-east, passing west of Spitsbergen. The result of this was that the balloon remained for a long period north of the central point of the low-pressure area, amid faint easterly winds, and on the outskirts of the rainfall area which was distinguished by fog and a slight rainfall. By 1 p.m., the atmospheric pressure at Spitsbergen had risen to 29.406 inches, and by 8 p.m., to 29.874 inches. The low pressure, consequently, had moved onwards. During this drift of the balloon westwards, the weather continued to be very foggy, sometimes with a fine rain, but with glimpses, now and then, of a clearer sky. The balloon, which was weighed down by the fog, floated at a low altitude and very often struck against the ice.

During the next stage, the balloon lay still, one of the guide-lines having fastened around a block of ice. This stage lasted for thirteen hours, or until 10.57 a.m. on July 13. The fastening of the balloon in this manner is, to a certain extent, connected with the fact that the wind, under the influence of an approaching low barometrical pressure, had swung round to the north-west. With this north-westerly wind, the velocity of which rose to about 16.5 feet per second, the balloon, if it had been free, would probably have been carried a long way back towards its starting-point. But we find, however, no noteworthy change of temperature, or in the weather, which latter still continued to be foggy.

The next stage lasted six and a half hours, or till 5.33 p.m. on July 13. The wind now came, on an average, from the west, but was rather faint, the mean velocity being 12.7 feet per second. The fog lifted a little towards midday but soon returned, and the hoarfrost from the mist began to form on the cordage. During the next stage (until 9.06 p.m.), too, the wind was almost westerly, with a slight tendency to the south. The mean velocity was 12.7 feet per second. The last stage lasted until 7.21 a.m. on July 14, when the journey came to an end. The wind was now, on an average, south-westerly, but the mean velocity had increased to 17.2 feet per second. By 12.50 a.m. the barometer had risen 0.234 inches during the previous twenty-four hours. The south-westerly wind did not last long, however, but, according to the memoranda made after the landing, had swung round to the north-west during the course of the day.

When the first communications from the Andrée Expedition came by the carrier-pigeon which was sent on July 13, great astonishment was awakened by the fact that the party had not traversed a greater distance, and many persons expressed a doubt as to the accuracy of the communication. In consequence, Ekholm investigated the most probable meteorological conditions prevailing during the first two days of the balloon journey. In his article on the reasons why the balloon could not have travelled farther, he began by assuming that a low-pressure area had lain north-west of Spitsbergen on July 11, and had moved on eastwards, north of Spitsbergen, during the two days, July 11–13. Ekholm marked on a sketch-map the position of this centre of depression on July 11 as being quite near the east coast of Greenland, and, on July 13, north-westwards of Franz Joseph Land. The balloon, consequently, would have penetrated and remained for a long time within the centre of the low-pressure area with its dead calms and its varying winds. Moreover, he supposed that the cyclone-area had been of a longitudinal form, extending in a north-south direction, so that the calm area could extend all the way down to Spitsbergen. From what has been said above, it seems possible that the uniform low-pressure area had come from farther south and had passed close to Spitsbergen, whereby the balloon, during the long period of its movements towards the west, had the whole time lain north of the centre, and within the area of faint, easterly winds with the rain and fog which are characteristic of them, especially if the low pressure had lain open towards the north. The direction taken by the low-pressure cyclone was probably towards the north-east, thereby bringing the balloon into the vicinity of its centre; during this movement the wind was first of all north-west, then west, afterwards more southerly and, finally, north-west. In any case, if either of these interpretations of the wind conditions is that which best agrees with the real state of things, we may confidently express the opinion that the expedition was very badly treated by the weather, which turned out more unfavourable after the start than they had reasons to expect. But it cannot be denied that the opinion they had formed at home of the weather conditions to be expected during a polar flight in a balloon, had been altogether too optimistic, and, above all, that too little consideration had been paid by them to the frequency of fogs in these Arctic tracts—a circumstance, the fatal results of which the travellers were, unhappily, soon to experience.

Technical Account of the Flight

By Maj.-Gen. K. A. B. Amundson and Prof. I. Malmer

From a technical aeronautic point of view the flight of the Eagle may be divided into two very different periods. The first—*that of the free flight*—lasted from the start at Dane Island at 1.46 p.m. on July 11, until immediately after midnight on July 12. The second period—*involving the use of guide-ropes*—begins then and continues until the final landing of the balloon on the ice, at 7.20 a.m. on July 14.

The flight is best followed with the aid of a sketch-map and diagrams in any discussion of the balloon's course, position, and altitude at various times. At the very start the balloon fell so low that the gondola dipped into the water. Aside from the lessening of the speed of the balloon by the drag- and ballast-lines, this was probably caused by the southerly wind, which, after crossing the hill to leeward of the balloon-house, descended obliquely towards and across the water. The amount of ballast thrown out on that occasion amounted to 455 pounds of sand, and, thanks to this and to the loss of the lower parts of the guide-ropes, the balloon rose to a height of 1950 feet. Of course it may now be said that the amount of ballast sacrificed was unnecessarily great, but the men in the balloon had probably not then observed the loss of the drag-lines. This great dimunition of the weight altered the entire plan of the flight, according to which the ropes were to have ensured not only dirigibility but also an automatic stabilization of altitude within limits as low as 500–650 feet. The journey was thus changed from the very beginning into a free flight, at a relatively great height, with a consequent loss of gas.

On starting, the balloon was calculated as able to carry a ballast-weight of 2715 pounds, distributed as follows:

Ballast-lines	889	pounds
The freely hanging part of the guide-lines	1,067	"
Sand, 15 sacks of 50.6 pounds each	759	"

The weight of those parts of the drag-lines which were lost at the start amounted to 1166 pounds, while the weight of the remaining parts suspended from the balloon was 561 pounds. The mere loss of these guide-lines gave the balloon an additional lifting-power of 506 pounds—the difference between the free guiding parts of the drag-lines and the parts left hanging from the balloon. After the dumping of 455 pounds of ballast the balloon would therefore have had a lifting-power of 506 pounds plus 455 pounds, i.e., 961 pounds. This lifting-power would, under normal atmospheric conditions, have been sufficient to raise the balloon to a height of 2400 feet. As a matter of fact, after 18 minutes, the balloon had attained a height of 1950 feet, which it seems to have retained until it began to fall again as a result of the cooling of the gas. The fact that the balloon attained a height of only 1950 feet may possibly point to an over-estimation of the carrying-power in the first place, but it may also have resulted from a cooling of the gas.

If we presuppose that at the start the balloon was well filled, this first rise must have caused a loss of gas amounting to about 11,480 cubic feet, with, consequently, a diminution of the carrying-power of about 792 pounds at the surface of the earth.

During the period of free flight, in the course of the afternoon, the balloon unexpectedly sank considerably on two occasions; the first time until the guide-lines, now only about 360 feet long, touched the water, the second, to a height of 780 feet. Otherwise, the journey during this period continued at an altitude between 1650–2300 feet.

The first of these falls was caused by the passage through a cloud; the second was evidently the result of the cooling of the balloon by slight fogs. When these mists had disappeared and the sun had grown hot, the balloon once more rose in stages to as high as 2300 feet. During this ascent a note was twice made that there was a "whistling" in the valve; the first time, the duration of this whistling is indicated as "a long while"; on the second occasion no note is made respecting the length of time. The whistling is expressly stated to have come from the "large valve," i.e., the automatic safety-valve at the bottom of the balloon. As the gas could not force its way through this valve before a certain overpressure had been reached in the bag, the whistling proves that the balloon was now much distended by the gas. If we take into consideration that at the very start, a relatively large amount of gas must have been lost, then the remaining gas must have become somewhat considerably heated by the sun during the flight. The whistling from the valve was evidently a normal phenomenon, caused by overpressure in the balloon. It is clear that the men did not attach any great importance to it. Still, in consequence of the heating of the balloon during its flight at this height, there must have been an additional loss of gas, although it is impossible to determine the amount.

Just before 9.43 p.m., the balloon fell somewhat, down to the surface of the upper clouds at an altitude of 1650 feet. In order to prevent a continued descent, there are now sacrificed a buoy (No. 4), and 17.6 pounds of sand or, altogether, a ballast-weight amounting to 22 pounds; between 10.22 and 10.30 p.m. there were thrown overboard eleven rungs of the rope-ladder and 17.6 pounds of sand, while, at 10.55 p.m., buoy No. 7 was thrown out, making a total loss of 28.6 pounds. At 11.11 p.m., the balloon is floating at a height of 1500 feet.

Immediately after midnight, between July 11 and 12, the balloon enters the shadow of a cloud, and then begins to fall rapidly because of cooling, so that, within four minutes, it has sunk so low that the drag-lines touch the ice. This lightening of a part of the weight of the drag-lines arrests the fall of the balloon, and the journey is continued with a part of the lines dragging along the ice.

From this moment, the free flight is ended. A new phase begins, during which it seems that the men wish to continue the journey with the lines dragging along the ice, in better agreement with the original plan. There still remains sufficient ballast to permit of the balloon rising if this should become desirable. During the hours spent in the free flight, preparations had been made for just such eventual "guide-roping" by splicing lines to the required length.

The total loss of ballast during the first, free-flight period (disregarding the loss of the lower drag-lines) [1] amounted to:

At the start	506 pounds
On dipping into the water	455 "
Later, 2 buoys, 11 ladder-rungs, 35.2 pounds of sand, probably a total of about 1012 pounds	

By this diminution of ballast, compensation had been gained for the lessened carrying-power of the balloon caused partly by loss of gas—

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[1] This part of the drag- or guide-lines cannot be considered as ballast in any case, although its purpose was to prevent the balloon from rising too much when the gas became heated. From the first these lines were intended to rest on the ice or water and were not meant to serve as ballast to be thrown overboard.

probably not less than 792 pounds—and partly by the cooling of the gas. Of the weight, 2715 pounds, originally calculated as ballast, there was still left about 1703 pounds. In addition to this, there was extra ballast consisting of a certain part of the equipment which could be thrown overboard should such a step become necessary.

The guide-rope journey begins. About 1 a.m. the balloon is following an easterly course below the clouds at a speed of 10.7 feet per second and at a height of 65–325 feet. The fog grows denser and, first of all, 26.4 pounds of ballast have to be sacrificed; this is followed by a buoy (4.4 pounds). At 1.26 a.m. the balloon stops for a while because of calm.

There is no chance at all of steering, the guide-ropes—although one of them has been made longer by splicing—being unable to counterbalance the dragging across the ice of the ballast-lines. The result is that the balloon assumes a position directly opposite to that which would permit sailing. At the beginning of the free flight the sails had been lowered because they then had no function to perform, but they had evidently been hoisted again to serve as auxiliaries in the intended steering during the guide-rope period. Now, however, they only press down the balloon by reason of their adjustment.

The balloon stops once more, on this occasion for forty minutes, but then continues its journey at a height which does not exceed 210 feet. At 3.06 p.m., the car begins to bump against the ice so that the travellers are obliged to throw out the guide-line cutters, 55 pounds of sand, ropes, a grapnel, a pulley, etc., and, as this is of no avail, the "Pole-buoy"; a total of about 330 pounds. After a couple of hours the bumps increase incessantly in frequency until, after 6.33 p.m. there is a bump every minute or every minute and a half. At 10 p.m. the balloon stops, weighed down altogether, dripping with water.

Between 1 a.m. and 3.06 p.m. no ballast was thrown overboard, and the balloon appears to have continued at a comparatively good speed and, approximately, in equilibrium, balanced by the dragging ropes. The loss of gas during this period, consequently, would seem to have been moderate. The reason that the balloon was afterwards unable to remain floating, in spite of lightened ballast, was the increasingly dense fog which weighed the balloon down heavily.

When July 13 begins, the balloon has been lying fastened since 10 p.m. on the twelfth. It is unable to rise, and the wind is too weak to set it moving. A little later, the fog lightens and the sun shines through, with the result that, at 10.55 a.m., the balloon breaks free unaided. It had been held fast for thirteen hours because the drag-line had caught under and around a block of ice.

The balloon now moves slowly forward at a low altitude. The fog grows dense again and there begins to fall a fine rain accompanied by the formation of hoarfrost on the balloon. The result is that the car again begins to strike against the ice. A buoy and a medicine-chest are thrown out, their combined weight about 22 pounds. The balloon then seems to have risen a little, and the memoranda state that the ropes "scrape themselves straight," i.e., arrange themselves next to each other in proper order. But the balloon sinks once more, and the blows against the ice become worse and worse.

At 6.30 p.m., however, Andrée observes that the balloon still contains much gas, for it has fallen in only about one-third of the "belly-band" or equator. From what we know of the dimensions of this belly-band, and its position on the balloon, we may approximately calculate the loss of gas hitherto suffered. This calculation shows that the loss in question must have been about 16,900 cubic feet. Of course, the statement "one third of the belly-band" is no very exact determination of measure. If we assume that the balloon had, instead, fallen in up to a line marking the middle of the equator, the loss of gas would have been about 21,200 cubic feet. Andrée can certainly not have made so gross an error; the loss could not have amounted to much more than 16,900 cubic feet. Svedenborg calculated the loss of gas from leakage, as observed while the balloon was still in its hangar, as corresponding to a diminution in the carrying-power of not more than 185 pounds per 24 hours, i.e., a loss not exceeding 2685 cubic feet per day. If we assume the loss of gas from leakage to have been equally great during the flight, then we arrive at the figure, 5900 cubic feet lost, for the two and a fifth days that the balloon has been in the air. If there be added to this the amount of gas—probably about 11,475 cubic feet—which was lost at the first ascent to a height of 1950 feet, then we obtain a total of 17,375 cubic feet lost, i.e., very nearly the amount obtained by our calculations based on Andrée's own observation. The loss of gas during that part of the high-level flight when a whistling was noticed in the valve could evidently not have been very great.

If the probable loss of gas up to the moment at which we have arrived be put, in round numbers, at 17,500 cubic feet, it would correspond to a diminution of the carrying-power by 1210 pounds. The thermometer, during the whole of the guide-rope period, remained at about 32° F., so that the carrying-power of the balloon cannot have been affected to any great extent by variations of temperature. The weight of the ballast hitherto lost amounted to 1395 pounds. As the car continually struck against the ice, the carrying-power of the balloon —aside from the ballast just mentioned—must have been further diminished by a total amounting to the weight of the ballast-lines and the remainder of the guide-lines, i.e., 1450 pounds. The carrying-power of the balloon, consequently, is about 2800 pounds less than at the moment of starting. The bumps against the ice are not, of course, a result of the diminution of the carrying-power alone; they are due, in part, to the checking of the balloon by the friction of the ropes against the ice. As the speed of the balloon at this phase of the flight was extremely small, the influence of such checking of speed must certainly have been very little, however.

Assisted by these calculations we are able to deduce that the diminution of the carrying-power of the balloon was the result, to a very great extent, of the weight of water and ice carried. We might also venture to deduce from Andrée's observation, if we read it with the above calculations of the loss of gas in mind, that the gas-tightness of the balloon did not decrease to any great extent after the start. We are supported in this by the fact, already pointed out, that between 1 a.m. and 3.06 p.m. on July 12, it had not been necessary to throw any ballast overboard.

At 8 p.m. a great effort is made to get the balloon to lift and sail. There are thrown overboard six little buoys, of a total weight of 26.4 pounds; the winch (35.2 pounds); 165 pounds of sand; a barrel weighing 13 pounds; and provisions to a total weight of no less than 440 pounds. The whole amounts to 680 pounds. Now the balloon rises sufficiently to allow the sails, which have been set athwart and made taut, to carry well, but only after an additional 110 pounds of ballast have been thrown out. For one moment a real guide-roping sail goes on.

During this time, the height is not mentioned otherwise than in Andrée's remark that they saw an immense polar bear about 100 feet below the balloon.

But the flight seems to have come to an end very soon. At 10.30 p.m. the car once more begins to strike violently against the ice. The fog is dense. At 11.30 p.m. the spliced guide-rope breaks.

The next day, July 14, the first hours pass in the same way, with continual bumps against the ice, while the balloon drifts slowly onwards towards the north-east. After 1.34 a.m., a fresh attempt seems to have been made to direct the course by means of the steering arrangement. The effort appears to have been unsuccessful, as the side-sails were cut away later on. The scanty remarks give no details respecting these measures.

Finally there is a note that at 5.28 a.m. the balloon, from some unknown cause, has "risen high" in the air—the height is not mentioned—but that it has been brought down again a few minutes later by opening both the regulating-valves.

What took place during the time immediately afterwards and until 7.20 a.m., when the members of the expedition "jumped out of the car," is unknown. From Strindberg's photographs, taken immediately after the landing, it seems, however, that this manoeuvre was carried out normally.

The balloon, whose "bursting" apparatus has not been used, is lying on the ice, still half-filled with gas, and with the car and the ropes behind it, in the direction of the wind. The belly-band is visible in its proper position on the windward side. Three thick ropes—one very thick—and two other thin—lines can be seen lying extended behind the car. The thinner lines are evidently the anchor cables. The number of the guide- and ballast-ropes had been eleven at the start. Nothing is said in the memoranda of this great loss of ropes, or whether they were dropped voluntarily. There may be some connexion in this with the sudden rise of the balloon, mentioned just before the end of the flight.

A short summary of the course of the journey shows that, from the start to the landing, the Eagle had remained aloft 65 hours 33 minutes, i.e., almost three days.

The free flight carried the balloon, in 10 hours 29 minutes, at a good speed, mainly in a north-easterly direction, to a distance of about 250 miles from Dane Island.

The guide-rope period lasted 55 hours 4 minutes, during which period, however, the balloon lay still on three occasions for a total of about 14 hours. This phase was marked by a slow rate of speed; the course taking the balloon first about 117 miles, mainly in a westerly direction, then eastwards and, finally, north-eastwards. The total length of this phase of the journey amounting to about 267 miles. The spot where the party finally landed, situated in 82° 56′ N. lat. and 20° 52′ E. long. Gr., was no more than 56 miles distant from the spot where the free flight had ended, 55 hours earlier. It was about 300 miles from the place where the flight had begun.

The route followed by the balloon, between its start and landing, point to its having moved in the neighbourhood of a barometrical minimum, lying immediately north of Spitsbergen, and travelling in a north-easterly direction. The balloon was afterwards driven about, from the beginning of the second day, by the shifting winds which prevail around the centre of a cyclone.

After the time when Andrée made his observation about the gas, and until the end of the flight, there was thrown overboard a total of 680 pounds of ballast. It is evident that the weighting of the balloon by ice-formation increased considerably during the last thirteen to fourteen hours of the journey. The total diminution of carrying-power from the beginning to the end of the flight amounted to about 3476 pounds. The loss of gas probably accounted for about 1320 pounds of it. When this loss reached about 2200 pounds, the balloon, at the close, must have been weighed down by the ice on it. Andrée, too, remarks in his diary that on landing the balloon proved to be much covered with ice.

It may, therefore, be considered as certain that the reason the Eagle was unable to remain floating any longer was its being covered by ice in the damp, cold polar air. When planning the flight, Andrée had reckoned on snow and water being deposited on the roof of the balloon, and had endeavoured to reduce its importance by arranging a cloth calotte, or cap, above the top of the balloon. Strangely enough, the fog, and the ice deposited by fog, were not taken into calculation. At the end of his logbook, and under the remarkable heading of "Proposed Alterations for the Next Polar Balloon Expedition," Strindberg makes, *inter alia*, the suggestion that it ought to be possible to warm the gas a little by boiling water in the car, and condensing the steam in a sheet-iron box inside the balloon. Such a suggestion lends additional support to the correctness of our explanation of the Eagle's inability to remain in the air. Strindberg's plan aimed at keeping the balloon covering so well heated, when the external air was near the critical temperature of 32° F., that the deposition of ice in the netting would be prevented.

In the same place in his logbook, Strindberg also proposes that the future balloon shall be made of silk similar to that used for the Eagle, but that the volume of the bag should be raised to about 212,000 cubic feet. The cloth employed in the manufacture of the balloon has evidently given rise to remark, while an increase in the cubical content has, equally clearly, been found justified by the necessity of carrying a greater weight of ballast. Besides, an increase in volume would increase to a much smaller proportion the superficial area of a balloon. This, in its turn, would decrease the deposition of water or ice in its ratio to the carrying-power of the balloon.

One of the corner-stones of Andrée's magnificent plan for his polar expedition was the idea of the drag- or guide-ropes, with their twofold task of regulating the altitude of the balloon, and, at the same time, of affording a means of steering it. With the loss of the lower two-thirds of the guide-ropes, there vanished, practically speaking, the possibility of applying the steering principle. As the length of the remaining drag-ropes—358 feet—did not very much exceed the 228 feet of the ballast-lines suspended to the opposite side of the bearing-ring, all the ropes, as a rule, dragged across the ice at the same time when the balloon was low enough, thereby preventing the adjustment of the balloon necessary for steering purposes. Little or no steering could ever have been attempted. The remaining parts of the drag-ropes, in combination with the ballast-lines, did of course help to bring about an automatic regulation of the altitude—although within certain limits—during the drag- or guide-rope period of the flight. The experience gained during this phase seems to have been, however, that the practical realization of the guide-line idea did not fully satisfy the demands caused by the abrasion against the ice. Strindberg, in his above-mentioned proposed amendments, makes the remark that the guide-ropes should be sheathed with metal.

One is inclined to ask oneself the question: What would have been the difference in the course of the balloon flight had the guide-ropes not been lost at the start? During earlier discussions of the plan, the apprehension had already been expressed that the drag-ropes, had they remained entire, would have so checked the speed of the balloon that it would have been forced down into the water, and the expedition would have met with disaster at the very start. But such fears are doubtlessly exaggerated. Throwing out ballast would have saved the travellers from an unpleasant but, most certainly, not a critical situation, just as it did in the real case. The experience gained during the free flight shows that a part of the guide-ropes might be allowed to drag through the water without any attendant risk, and this even when a strong breeze was blowing.

A suitable regulation of the amount of ballast thrown overboard would have enabled the aeronauts to avoid the free part of the flight altogether, and to re-establish the guide-rope flight at the very commencement. The loss of gas caused by the free flight would thus have been obviated. There would have been a greater chance of success for the automatic regulation of the altitude. It would have been possible to obtain a certain dirigibility of the balloon, so that, for instance, the course at the very beginning of the journey might have been set somewhat more to the north, although the speed would, of course, have been considerably lessened by the dragging of the ropes against and through the water. However, these steering possibilities were undoubtedly over-rated by Andrée.

But it is of little use to discuss what might have occurred had circumstances been other than they were, for, in addition to the uncertainty always attached to calculations of the strength and direction of the wind, there remain the fog and hoarfrost bringing up the spectre of an icy coating ready to cover the balloon, to stultify every estimate.

Nothing remains to be said but that the balloon might have remained aloft for some days more, but, only on two presuppositions: that the guide-ropes had not been lost, and that the balloon had not been weighted down by the fog.

Pack-Ice

By Prof. H. U. Sverdrup

Andrée's diary contains a series of observations concerning the ice, its appearance, melting, freezing, drifting, etc.

Andrée's description of the pack-ice during the summer does not differ from the account given of it by other explorers, but seldom has there been written such a vivid description of the superhuman efforts demanded by a march across the drifting pack in the summer. The long walls of hummocks—pressure-ice—which, during the winter, are partially covered by snow-drifts, then reveal themselves in all their naked frightfulness, surrounded by melted snow into which one sinks deep. Between the pressure-walls, the pools and channels of fresh water compel the traveller to make long detours, or again the water may be covered by a thin, treacherous layer of new-fallen snow. Suddenly, further passage is prevented by a fissure or a lead, and a boat must be used for ferrying across.

From the observations he made during the balloon flight, Andrée had scarcely expected the march across the ice to present such great difficulties. We learn from his notes that he was prepared to find on landing numerous openings and fissures in the ice which would create some embarrassment during the course of a trek, but that he considered the ice itself fairly easy ground to get across.

It is, however, extremely difficult to judge the character of the ice from above. In the uniform greyish light so characteristic of the sunless Arctic summer, there are no shadows and no contrasts to point out the inequalities. Everything looks the same; expanses of pressure-ice, which makes passage with sledges extremely troublesome and fatiguing, appear, when seen from above, to be as flat as a floor. During the flights undertaken from the *Maud*, during the summer of 1923, we of the Norwegian Expedition learned to understand this, and Amundsen had the same experience during his expeditions in 1925 and 1926. If Andrée had been able to speak of his observations himself, he would undoubtedly have pointed out that the character of the ice can hardly be judged when seen from the air, and his remarks would later on have possessed a special value for all the flights across the polar ice planned afterwards.

It was possibly this favourable impression that Andrée received of the ice conditions which determined him to direct his course towards Franz Joseph Land. We may be certain that it was not only the drift of the ice westwards, but also the difficulty of making his way across the ice, that compelled him to give up his bold plan.

From Andrée's remark on August 3 and from the daily memoranda it is clear that the party did not encounter ice smooth enough to be easily traversible. On the contrary, it was only on one single day—July 28—that Andrée and his comrades could pursue their hitherto tiring march across comparatively smooth ice; it was only on one occasion that they met with what Andrée calls "parade-ice" (paradise). As a rule, the ice was what Andrée often describes as "terrible."

It was not only the pressure-ice, with its hummocks, which placed difficulties in the way of the march. What remained of the covering of snow, together with the eroded surface of the ice, formed a layer of powdered-sugar snow, on which the foot slipped and in which the sledges caught fast. The pools and channels of fresh water compelled them to follow circuitous paths, and after the middle of August it not infrequently happened that these waters were covered with newly formed ice and snow-sludge, so that they could not be discovered until someone fell into them. Still greater difficulties were caused by the fact that the party was constantly obliged to ferry across leads, or more extensive openings between the floes. Andrée's observations agree with those made on board the *Fram* and later, on the *Maud,* during the summer months these vessels spent in the drifting pack-ice. Neither from the *Fram* nor the *Maud* was it possible to march in any direction as much as two miles from the ship without encountering wide openings or leads which were too broad to be crossed without the help of a boat.

We do not find in the diary any precise statements as to the width of the leads or openings, but, on August 1, Andrée writes that the state of things, on the whole, was favourable and that the day's march must have amounted to at least 4.2 miles. On August 6 we read: "The longest distance of all, probably not less than 3 minutes." Now, 3 minutes barely amount to three and a half miles, which would show that a day's march of 3.5-4.2 miles was something very rare. Later on in August, on two occasions marked by favourable conditions, the day's march was again estimated at the figures just given. If we compare this with the numerous memoranda concerning openings and leads, we find that the party very seldom covered as much as 1.2 miles in a straight line without encountering an opening in the ice, and that it never went as much as 6 miles without being forced to use the boat. Such information as this from the tracts north-east of Spitsbergen is of great interest, for, when compared with the observations made by the *Fram* and the *Maud,* it shows that, on the whole, the conditions of the ice during the summer are alike over vast expanses of the Polar Sea.

There is another detail in Andrée's description of the leads which is worthy of notice. According to the experiences of the *Fram* and the *Maud,* pressures are never dangerous in the summer, for the many openings between the floes allow them greater liberty of movement. When the ice-floes are driven together, one strikes against the next, and so on, and the pressure becomes distributed, but when, in the autumn, there is new ice between the floes, it is pressed together, and the pressure is concentrated along the lines of least resistance in the floe. One consequence of this is that, during the summer, an observer cannot notice much of the general movement of the ice. It is impossible for him to observe the total drift of the ice directly; he sees only a relative movement among the floes and this is less in the summer-time than during the autumn, after freezing has begun again.

These observations are confirmed in the best possible way by Andrée's memoranda. On July 31, for instance, he writes: "Out on the ice one cannot at all notice that it is in movement, except that, at our resting-places, the leads change *while we are sleeping*." I have italicized the last words, for they show that the alterations are slow. A little later, on August 6, we read: "*New difficulty:* the leads altering while we are crossing them." The italics are again mine, for from this expression we discover that, during the first three weeks of the march, the movements of the ice had presented no obstacle to the progress of the party. The next note concerning such movements of the ice is not found until August 17. After the middle of the month, when the new ice has commenced to freeze, it is evident that the ice is growing steadily more and more troublesome. During the period August 17–31, Andrée states, no less than five times, that the movements of the ice place hindrances in their path.

As to the ice which was something like "rolling country" and relatively easy to traverse, Andrée noticed that it had, at an earlier period, been exposed to violent pressure. Such rolling surfaces are met with where the ice has already been exposed to the influence of an Arctic summer, when the tops of the hummocks and the pressure-ice have melted away to some extent, and the depressions between them have been turned into pools of thaw-water. During the following autumn these pools freeze and, instead of pressure-walls and pressure-ice with sharp edges and pointed tops, rounded hillocks are to be seen. If such a field of ice be not exposed to fresh pressure, this levelling process may continue for another summer, leaving the ice at last quite smooth. If it be examined more closely, however, then—as Andrée observed—there will be noticed, in such level expanses, parallel, oblique markings, which show that the floe contains ice standing on edge.

Neither the leads nor the pressure-ice displayed any main direction. As a rule, Andrée describes everything as forming a confused mass although now and then he says that a lead, or a high wall of pressure-ice, runs for a long distance in a straight line.

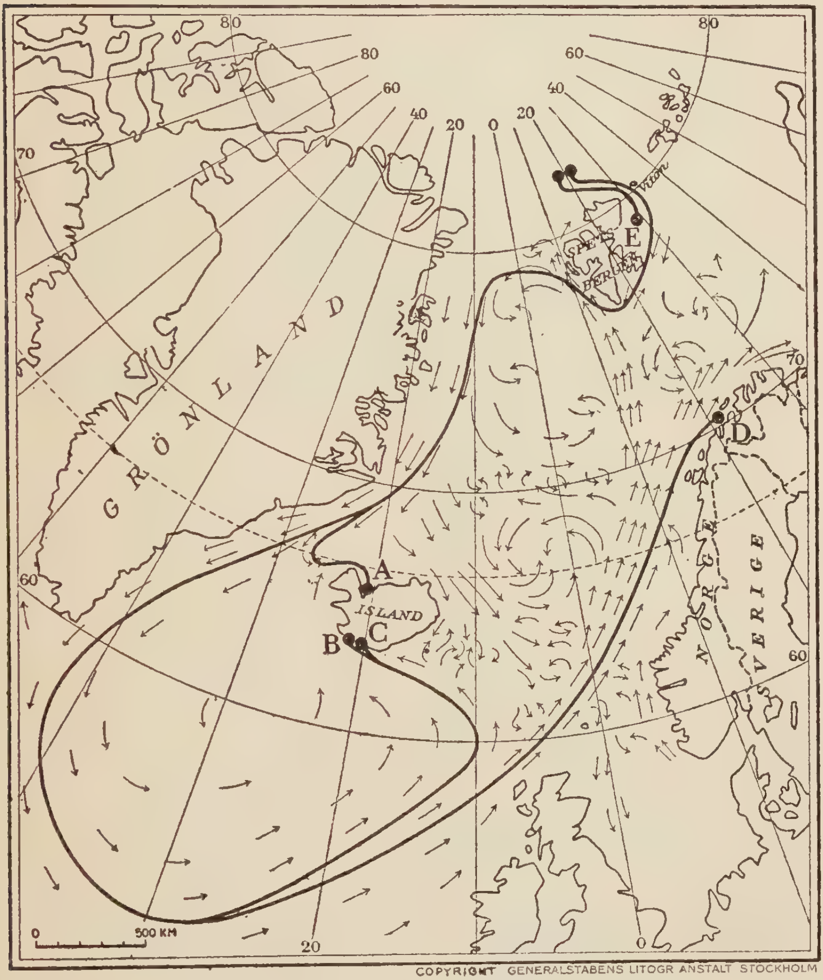
On one occasion, Andrée expressed the idea that the pressure was caused by the tide currents, but he did not return to the subject. He had evidently found that the theory was false, for if the tide-water currents play a decisive role in the pressure phenomena, then greater regularity ought to be looked for in the direction of the leads and pressure-walls. Andrée does not discuss the question of pressures, but it is clear that these result from the changing winds, as is doubtless the case within other tracts of the pack-ice. The wind does not blow evenly across wide expanses; its direction and strength vary from place to place. For this reason, the ice movement which it causes differs at different points, and, where the differences are great, the ice-floes are either pressed together or are torn from each other.

Andrée's attention, however, was caught by another effect of the wind, which was already observable at least at the beginning of August. On August 8 he writes: "If the wind from the south-west does what it has done before, i.e., closes up the leads, then it can keep on for a week or two." On this occasion, the expedition was approximately in latitude 82°. Within this tract, then, there must have prevailed a fairly strong current from the north, for the observations showed that, in spite of the south-west wind, they were moving southwards at a good rate. Andrée had been afraid that the wind would carry them northwards, but his fear was groundless. A strong current from the north could also very well explain the fact of the ice being pressed together by the wind. We cannot read from his notes whether the south-west wind had had the same result on other occasions, or if a wind from any other point of the compass had shown a tendency to break up the ice.

The information the diary gives on the results of the soundings taken on August 31 does not allow us to form any idea as to the correctness of Strindberg's calculations, but in all probability the figures for speed given are altogether too high. It is possible, too, that the ice has drifted westwards under the influence of an easterly wind, while, at some depth beneath the ice, the current has been running eastwards, so that the relative speed of the water has been especially high. But, even after taking all these circumstances into account, the differential speed resulting from the movements of the ice and the water—the latter at a depth of 230 feet—can hardly have been as large as 4.6 feet per second. The greatest relative speed of a current measured by the *Maud* was less than 1.6 feet per second.

In other respects, too, it is difficult, before all of Strindberg's observation material respecting the place-determinations has been checked, to deduce anything definite about the conditions of ocean-currents north-east of Spitsbergen. It is clear, however, that the wind played an important part in the drift towards the south-south-east, for Andrée points out that in the middle of September there was a fresh wind from the north-west, or from a more northerly direction, and this for a considerable period. But we also know—as from Nansen's researches north of Spitsbergen in 1912—that the current moves eastward along the north coast of the archipelago in question.

The drift of the expedition during the period July 14–October 2, together with the brief remarks (in Andrée's diary) respecting the direction of the currents, put a new light on the drift of the buoys which were thrown out during the balloon flight. The question of the course followed by the buoys has been thoroughly discussed by A. G. Nathorst in the book, *Andrée and His Companions*. Nathorst had no difficulty in stating the paths along which the four buoys might have come to Iceland or the coast of Finmark, but the discovery of the "Pole-buoy" on King Charles Land occasioned him and others much trouble. The fact that no one knew when and where the buoy was thrown overboard, and that no one had any idea, either, of the length of time the buoy had been lying on the shore before it was found, made the conditions for ascertaining the course and duration of its drift uncertain. Knowing what we now do of the time and place that the buoy was dropped, the question of the length of time it had been in the water becomes one of less importance. The greatest probability is that the ice, on to which the buoy was thrown, drifted southwards along the eastern coast of Spitsbergen in a direction approximately corresponding to that in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MAP OF THE DRIFT OF THE FLOATING BUOYS FOUND

which Andrée and his companions were afterwards carried. It may, therefore, have been thrown up on the shore as early as the winter of 1897–1898.

The other buoys also drifted southwards to the east of Spitsbergen but, instead of being thrown on shore in that neighbourhood, they entered the current which swings round the south point of this group of islands. By this current they were carried northwards again, along the west coast of Spitsbergen, and thence eastwards to join the East Greenland current towards the south. One of them, No. 4 (A), was caught by one of the backwaters in Denmark Sound and then drifted on shore on the north coast of Iceland, while the other three continued their path towards the Atlantic where, finally, they entered the North Atlantic Ocean current, the Gulf Stream. One of the buoys, No. 7 (D), was carried all the way up to Finmark, where it drifted ashore in August 1900, while the remaining two, Nos. 3 and 8 (B and C), were borne northwards towards Iceland, where they were thrown up on shore in July 1900. Thanks to Andrée's and Strindberg's notes, I believe that we may now consider the problem of the drift of the buoys solved, in its main features, at least. The probable drift is shown on the chart (p. 283), where the character of the current is also marked.

Let us now return to Andrée's description of the ice. In his memoranda there is a series of statements regarding the thickness of the ice, which, in most instances, was measured at the edge of fissures. But we shall see by what follows that these memoranda are not so clear as others in the diary. We are surprised to find the ice-floes so small, and it is possible that the measurements do not give expression to the actual thickness of the ice.

According to the measurements undertaken by a number of other expeditions, and, knowing what we do respecting the increase and the thawing away of the ice, we are entitled to expect that the drifting pack-ice encountered by Andrée would have a thickness of about 10 feet, and perhaps more. In any case, we must recollect that large openings are always formed at the edges of pack-ice at all seasons of the year, and that in the summer we expect to find ice which has been formed at a late part of the previous winter or spring. Such ice is, of course, not so thick as the pack-ice, unless it has been pressed together. Tracts with newly frozen and relatively thin ice must, in any case, be rare, for such ice possesses less power of resistance than the old, and is more easily pressed together. In spite of the circumstance that much of the ice encountered during the summer-time north-east of Spitsbergen may have been formed during the previous winter, we must therefore expect that, as a rule, the thickness of the ice will be about 10 feet or more. From this point of view it is surprising that Andrée found the ice so thin. In the memoranda which have been submitted to me, there are 62 statements respecting the thickness of the ice, and only in 4 instances is the thickness stated to have been more than 10 feet, while it is less than 5 feet in no less than 43 cases. It is clearly shown by the account given that the measurements do not refer solely to newly formed ice, for clay, pebbles, etc., were found on ice the thickness of which was given as about 40 inches, and such things are to be found only on old ice. There are, however, two notes in Andrée's diary which give us reason to think that the figures he has put down do not refer to the thickness of the drifting pack-ice itself. On July 31 there is an entry: "Thickness of ice 31.5 inches," but below there is written, within parentheses: "Depth of ice below the water 13.5 feet." On August 1, the thickness of the ice is stated as being 4.5 feet; at the same time there is given a sketch, in which the total thickness of the ice is stated to be 15.7 feet, and, according to the sketch, the 4.5 feet refer only to a projecting edge existing at that depth. If, in these two instances, the actual thickness of the ice exceeded 13 feet, while the measurements in the fissures merely give the thickness of a characteristic upper layer, then there is reason to assume that something like the same system of measurement was employed throughout, and that the figures given can be of no service in judging the actual thickness of the ice.

On the processes of thawing and freezing, Andrée gives a series of interesting observations, and we obtain a vivid impression of the irregularity with which the melting action goes on. On the surface of the ice there are formed, not only pools of fresh water, but also canals—often troublesome to cross—which unite these pools to each other. Some of the pools are so deep as to go clear through the ice, while others remain shallow all through the summer. We possess no more knowledge now than Andrée then had respecting the special conditions which give rise to this extremely irregular process of thawing.

As regards freezing, Andrée noticed that, during the summer, new ice is formed in the small openings at the boundaries between the fresh water running down from the ice and the salt water beneath it. This circumstance has been elucidated by Nansen, who points out that, even during the summer, the salt sea-water has a temperature below zero and that, when the fresh water comes into contact with this cold water, there is at once formed a thin layer of ice on the boundary-surface.

Of very special importance is Andrée's description of the way in which, within a short period during the autumn, there is formed a thick layer of ice-sludge on the surface of the large openings, as a result of thin layers of ice being pressed together. There is no doubt but that this pressing together of the ice on the outskirts of the Polar Sea is of essential importance for the rapid formation of ice during the autumn, but we may question whether the same factor plays any noteworthy role in the conditions existing higher up in the Arctic waters, as Andrée hints. Within those inner tracts, the openings are too small to allow this process to become of any special importance.

During his march across the ice, Andrée became more and more interested in the many small objects found on the surface—clay, organic particles, pieces of driftwood, shells, and several other such things. It is characteristic that the memoranda respecting these finds gradually become more comprehensive and that, by degrees, speculations as to the structure of the ice occupy more of the writer's attention. The march was monotonous: a daily trudging across broken ice, ferrying over leads, tiresome crossings of irregular bridges of ice. Under such circumstances, the attention is attracted more and more by details. A little gravel, a fragment of a leaf—everything becomes a real event. Andrée found a piece of ice which displayed an obviously stratified structure—layers of clay alternating with layers of clean ice—and he believed for a moment that he had discovered a piece of glacier ice. Later on, however, he noticed how the appearance of the ice altered, and was able to explain the peculiar structure as being the result of alternate thawings and freezings under definite conditions. But Andrée left unanswered many questions in connexion with the occurrence of the various small particles found upon the ice, and they remain unanswered today. Andrée points out that the study of these fragments would certainly aid us in discovering the region from which the ice came, and that the study of the stratification, which is clearly marked, thanks to these very particles, should increase our knowledge of the freezing and melting processes, and explain the bending and twisting of the ice under pressure. Such studies have hitherto not been made, so that Andrée's diary points to new fields in the research of sea-ice, and contain an impulse to our continued labour in that domain.

Animal Life on the Pack-Ice

By Prof. E. Lönnberg

The restless and peculiar world of the pack-ice captivated Andrée's interest to a high degree. Very distinctive of his character is the care with which, during the toil, the drudgery, of the sledge journey, he carefully observes and describes each feature of the strange landscape around him.

This holds good not least as regards the animal life. Of course, from a practical point of view, too, the fauna was bound to awaken the growing interest of the three travellers, to the degree that they found themselves more and more obliged to rely for their supply of animal food on the resources offered them by the polar world.

The observations on animal life, and on its intimate connexion with the anxieties of the party regarding provisions, will be found in Andrée's diary, especially in the sections dealing with the march across the ice. In the following pages there will be given a brief biological survey of the animal life encountered by Andrée and his comrades during their stay on the pack-ice.

The polar bear is the chief big game of the explorer in Arctic regions. Even during the balloon flight, there was observed at 10 p.m. on July 13 an enormous polar bear swimming not quite a hundred feet below the balloon: "He got out of the way of the guide-lines and went off at a jog-trot as soon as he got up on to the ice." Bears were frequently met with during the course of the journey across the ice. No less than ten were killed, supplying the party with an important addition to its provisions.

Of the dead animals, there were eaten, in the first place, the brain, tongue, and kidneys, as well as the best of the fleshy parts, depending on circumstances. As a rule, the meat was considered as having a better taste when it had been allowed to lie a few days. "Raw bear with salt tastes like oysters. Raw brain is good, too." The liver was always rejected, the men being aware that its consumption might cause poisoning. The blood, too, was used, being made into pancake, which tasted excellent. Andrée tried to mend the sleeping-sack with the skin, and found that the best material for his purpose came from the bear's front legs, the hide of which was the lightest.

Former polar expeditions and the experience of sealers have already taught us that during the summer the bear in those regions is usually to be found on the pack-ice. Here he ranges far and wide, looking for seals—his chief source of food. In the tracts seldom visited by sealers, where the polar bear is not driven away by human hunters, he abounds in great numbers. He chiefly resorts to the openings in the pack-ice, where seals assemble.

The seals, which are now and then mentioned in the pages of the diary after July 18, were probably the ringed seal (*Phoca hispida*). Among Arctic seals, this species is best able to make its way amidst the pack-ice and find its food there. It is content with very small openings in the ice, and its food consists chiefly of small crustaceans, amphipods mostly, and schizopods. These tiny animals occur in large numbers near the surface of the sea, so that the seal is never in fear of suffering from want of food. The first attempt by Andrée's men to shoot a seal of this species was not made until August 23. Later on, when provisions began to run short, the animal was constantly hunted, and every part of it was eaten except the skin and bones. The intestines, the stomach, and even the contents of the stomach are not excepted. On September 8 an effort is made to kill one with small shot, successfully, for the skull of these small seals is very thin.

Walruses were probably observed several times in the course of the journey. The first occasion was on the second day of the balloon flight, when, according to the diary, a "large seal" was photographed, the animal being, with more likelihood, a walrus.

Indeed, this animal remained a mystery to the travellers for some time, for Andrée on one occasion supposed one to be a whale. A possible reason for the mistake, and for the jest in the diary, about "a sea-serpent," is the fact—mentioned by Kolthoff and others—that walruses sometimes swim in line behind each other, bringing only their noses to the surface and now and then their backs, but not their entire heads. When this happens, the impression may easily be gained of a single long animal with several sinuous curves. On August 25 Andrée says that the great, mysterious creature has been seen, with two curves.

A specimen of the large bearded seal (*Phoca barbata*) was shot on September 19. The appearance of the bearded seal in the drifting pack-ice shows that the party had come to the vicinity of some coast, probably of White Island, or, at all events, to a shallower sea, for this large seal lives chiefly near the coasts. It feeds on crustacea near the ocean floor—such as crabs, the large bottom shrimps, and the like, and on a number of other lower animals, such as mussels, worms, etc.

Of birds, there were observed on the pack-ice seven, or possibly eight, species, if we include an uncertain report of July 15, when Andrée notes that "an auk flew to S.S.W.," not far from where the balloon descended on the ice. If this observation be correct, then it must have been a Spitsbergen thick-billed guillemot (*Uria lomvia*) and this is both the first and the last time the bird is mentioned in the diary. This species is a pronounced fish-eater, and cannot easily procure food far in amidst the ice.

Another member of the Alcidæ, the little auk, (*Alle alle*), also known as the king auk and the rotche, was seen first on July 18, when the expedition was approximately in 82° 50′ N. lat. It may seem strange that these small birds should make their appearance so far to the north, and so far from (known) land. But the explanation is easy. In the first place, we may presume that the birds seen were not breeding. Further, we must observe that the little auk lives almost exclusively on amphipods, the flea-like crustacea which are found near the surface of the water, so that the bird can easily procure food as soon as open water is accessible. We may even presume that these small crustacea are accustomed to assemble in great numbers in the leads and channels between the ice-floes, so that the little auk's table is better provided for there than in the open sea. Farther south, there were seen in the leads little auks which varied somewhat in appearance. On August 25, Andrée succeeded in shooting such a bird and he describes it in his diary. It thereby becomes clear that the "strange" birds were simply yearling little auks. The young birds at first assume a dress which, in all essentials, resembles that of the adults, but this they very soon change for a plumage with more white in it, and with just such a distribution between the black and the white as that described by Andrée. This second dress of the young birds resembles fairly closely the adult winter plumage. As soon as the young are able to fly, they often make their way to places rather far from the home-tract.

Among other Alcidæ, only the black guillemot (naturally of the Spitsbergen race, *Uria grylle mandti*), is mentioned several times. Its name is seen the first time on August 18, when the party was somewhat south of 81° 47′ N. lat. On September 3, in about 81° 15′ N. lat., Frænkel shot a young one of this species, which is described in some detail. Probably, this young guillemot, together with a couple of other older birds which were seen two days later, had come from Charles XII Island, where in 1898 the Nathorst Expedition found this species breeding. Other young guillemots, mentioned on September 15 and later, too, could just as well have come from White Island, the party being then in approximately 80° 45′ N. lat. for the Nathorst Expedition saw the bird at that island in 1898.

Although it does not seem to have appeared in any great numbers on any occasion, the fulmar (*Fulmarus glacialis*) is the bird which was observed most frequently during the journey across the ice. It is mentioned many times during July and August, but, most probably, Andrée has not troubled to make a note on each occasion when the fulmars appeared. As it is not every fulmar that has young each year, it is probable that the birds which appeared farthest north on the pack-ice were not breeding. Such non-breeding fulmars journey far and wide and seize an opportunity, now and then, of sharing in the booty taken by a polar bear. Later in the autumn, the fulmars seem to have become more rare, for Andrée writes on September 17: "Remarkably enough, the fulmars seem to have disappeared." As a matter of fact, there were very few birds at that time, with the exception of the ivory gulls. On September 22 there is a note that the ordinary fulmar is seen remarkably seldom.

The common skua is mentioned only three times. The first occasion was on August 2 when such a bird, in company with two gulls, was circling above the remains of a polar bear. Another was seen the following day. This was as far north as approximately 82° 15′ N. lat. It must certainly have been the common skua (*Stercorarius parasiticus*) for Kolthoff observed this species at White Island in 1898 and thought that it possibly bred there. All the specimens he saw there were in their white phase. This probably explains why, on August 25 (81° 45′ N. lat.), Andrée felt doubtful of his bearings when he saw a specimen in the dark phase. As a breeding bird, Kolthoff has also observed the skua in more northerly tracts than White Island, namely, on Charles XII Island, so that the specimen seen farthest north by Andrée had possibly come from that place.

On Charles XII Island, Kolthoff also found the great glaucus gull (*Larus hyperboreus*) breeding. But the Andrée Expedition never observed any adult bird of this species, and it was not before the party had come far down towards White Island that a young one was shot by Andrée, but he states that it had been seen a couple of times before.

The gull which was the most important for the expedition was the ivory gull (*Pagophila eburnea*). It had already been seen as far north as 82° 40′ N. lat. On August 11, Frænkel shot one specimen, which is described by Andrée.

These ivory gulls were considered a great delicacy, and, at one time in September, when the supply of meat was very low, these birds formed a valuable addition to the bill-of-fare. From what we know of the diet of the ivory gull, it seems very strange that it should taste so well, until we remember that cold and hardships make a sharp sauce. Although they are able to fish, ivory gulls are mostly on the look-out for offal of every description, such as the remains from a polar bear's meal, the dead bodies of seals, whales, etc., however putrefied the morsels may be. They will even feast on the excrement of bears, seals, and walruses. In Andrée's last notice of them, on September 19, they are called carrion birds.

On August 22, Andrée shot and described a young ivory gull. At that time the expedition was still north of 81° 40′ N. lat., i.e., very far north of White Island, where the expedition of 1898 had found multitudes of ivory gulls breeding. Andrée's discovery of this young ivory gull therefore confirms Kolthoff's observation that, as soon as they can fly, the young birds make very long excursions across the ice-filled sea.

The most interesting of all Andrée's ornithological observations, however, are those respecting the Ross's gull (*Rhodostethia rosea*). This little circumpolar gull, the most beautiful of the whole family, still offers many problems to be solved regarding the story of its life. It belongs to the extreme Arctic regions, and has also been reported north of Spitsbergen. This latter observation, however, has been doubted of late years by such naturalists as the Rev. F. C. R. Jourdain, an authority on the bird fauna of Spitsbergen. But in Andrée's notes there are such detailed statements and descriptions of the Ross's gull that his evidence is quite decisive. The first time the Ross's gull is mentioned in the diary is in the notes of July 25, when the expedition was between 82° 35′ and 82° 40′ N. lat. and about 30° E. long. There we read: "Gull with red belly. Wings blue underneath and above. Dark ring around neck." This is a perfectly unmistakable description of the Ross's gull, if for "red" we read rosy-red, and for "blue," grey-blue. During the period between July 25 and August 30, Andrée observed at least fifteen, and probably seventeen, Ross's gulls. Not much is said respecting their habits, but on August 1, when three were observed, he writes: ". . . two of them almost unafraid, unlike what has otherwise been the case." On August 6: "Shy, visit once and then fly away." Andrée does not state whether they flew in any certain direction, so that they might be considered as being on passage, or whether they were merely flying about over the pack-ice looking for food in the open leads. But as they were observed for somewhat more than a month—from July 25 to August 30—they could not have been in any great hurry.

The Ross's gull was first observed and described in 1824, from specimens seen in Melville Peninsula in Arctic North America. Since then it has been met in various places (some few errant specimens even so far south as southern Europe). But this gull's natural habitat is in Arctic countries. They have been closely observed within these regions, and specimens have often been obtained for museums. Fairly many, for instance, have been found on the west coast of Greenland. But only in a few places has the Ross's gull been seen together in any great numbers. In this respect the Point Barrow territory, on the north side of Alaska, stands first, both as regards time and extent. An International Expedition there in 1881 observed Ross's gulls daily between September 28 and October 20. On certain days they were extremely numerous, coming in small flocks, and they flew, in general, towards the north-east. Not a single specimen was seen during the following spring and summer, but they became just as numerous again from September 21, 1882, on. They were mostly young birds which, like the specimens seen the previous year, were directing their flight towards the north-east. This flight continued far into October. The *Fram* Expedition observed Ross's gulls on several occasions, for instance, at the beginning of August 1894, when a number of young birds were shot in 81° 5′—81° 8′ N. lat. Another observation which, as regards the season, has a resemblance to that made by Andrée, was made during the period July 11–August 14, 1895, north-east of Franz Joseph Land between 82° 10′ and 81° 30′ N. lat. At that time Nansen saw a large number, most of them adult. On the same date, seven Ross's gulls were seen by the crew of the *Fram* Expedition as far north as 84° 27′–84° 41′ N. lat. As regards the season, therefore, these observations in the extreme north are in agreement with Nansen's and Andrée's. The most interesting series of observations on this bird has been made by Buturlin, the Russian ornithologist, who in 1905 found the Ross's gull breeding in large numbers in the delta-land of the river Kolyma, in north-east Siberia. Of special interest in this connexion is Buturlin's finding that the Ross's gulls leave their breeding-places as early as July 11 and fly towards the Polar Sea. At a later date, the *Maud* Expedition also shot Ross's gulls in the Kolyma delta, and afterwards also found specimens towards the north and east of the New Siberian Islands, during August–October 1923. It is evident that the Ross's gull which makes its appearance late in the summer and in the autumn in these parts of the Polar Sea may very well have its breeding-place on the tundras of the Kolyma delta and in other places in north-eastern Siberia. But one can scarcely believe that the birds observed north-east of Franz Joseph Land even before the middle of July could have come there at such an early date from breeding-places lying so far to the east. This remark holds good especially for the specimens seen by Andrée. There must therefore be one or more unknown breeding-places, lying more to the westwards, in the Arctic regions of the Old World. It has been suggested that such breeding-places might exist on Franz Joseph Land, but it is improbable that spring should begin there at a date early enough to allow the Ross's gull to breed and have its young ready to fly by, or before, the middle of the month of July. Nor would the Ross's gull be happy breeding on the stony and rocky islands of the Polar Sea, for its proper home during the breeding-season is the grassy and low-lying marshlands of the tundra, where, even in the early part of the summer, there are rich stores of the insect food with which the Ross's gull feeds its young. The problem of the life-story of the Ross's gull has therefore not yet been fully solved. Among the things, for instance, which we do not know, are: Where does the main body of the Ross's gulls spend the winter? What paths do they follow when they return from their autumn expeditions to the extreme Arctic regions where Andrée, for instance, found them?

Fish are mentioned in Andrée's diary only on two occasions. The first specimen was seen on August 13. It is described as having three dorsal and two anal fins; it was, of course, a codfish and, under the circumstances, very probably a polar cod (*Gadus saida*). Andrée's description of it is not in conflict with this assumption. The polar cod is found everywhere in the Polar Sea, being often met with swimming near, or immediately at, the surface of the water; it is also observed amidst the ice, in complete agreement with Andrée's statement. The second fish mentioned in the diary, on August 24, is given such a scanty description by Andrée that its species cannot be guessed at.

Lower animals are not mentioned in the diary. It is only casually that crustacea are mentioned, as having been found in the stomachs of seals that had been killed. Andrée writes on September 15: "I have rigged up a landing-net to catch plankton, or anything else that can be found in the water." We do not know whether any results were obtained, but, if there were, the specimens are lost. But Andrée's intention gives fresh evidence of his desire, in spite of the slightness of his resources, to do as much as possible for the promotion of science. It is in this light that we must read the notes in the diary on which this brief commentary has been made.

Remarks on the Map of the Route Taken by the Expedition

By B. Aurell

The Balloon Flight

The accounts that form the basis for determining the route taken by the Eagle are, first, the observations respecting the course and speed of the balloon which, at average intervals of one hour, are found noted alternately in Andrée's diary and in Strindberg's memorandum almanac; secondly, the solar observations carried out in the car by Strindberg with the level-sextant, and which are mainly found in the almanac; and, finally, those taken by means of the altazimuth, on the ice the day after the landing, and which fill pages 6 and 9 in the "log-book."

The statements respecting the course and speed are to a high degree unreliable (see p. 297—the dotted line shows the route-curve which has been obtained on the basis of these statements alone). They can only serve to give approximately the varying directions during the journey but not to fix the route-curve in its entirety and the position of its projection on the surface of the earth.

The fixing of this curve rests partly on the terrestrial position-determination in point A, obtained by taking the bearings of the north point of Vogelsang and Gray Hook, and partly on the astronomical observations carried out at points B, C, D, and E.

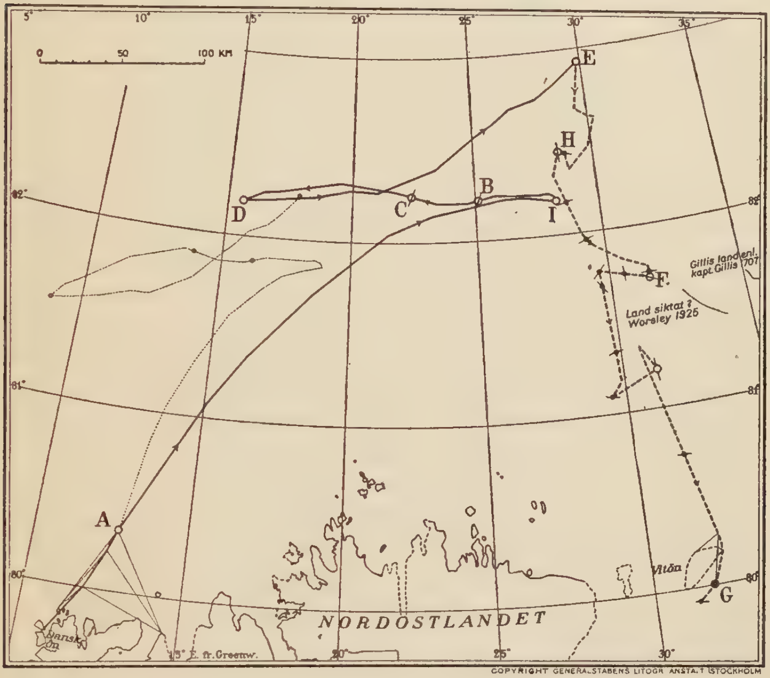
The observations at points B and C, of which the former gives a latitude-determination, and the latter a determination of the longitude, were carried out while the balloon was in motion, and should be considered as relatively unreliable as compared with those carried out at points D and E. The observations at point D were carried out under calm conditions, while the balloon lay anchored, and consist of two observation series for longitude-determination and one series for the determination of the latitude, which, under the presupposition of a normal movement of the chronometers, together give a reliable place-determination. The observations at point E, carried out by means of the universal-instrument (altazimuth) on the ice the day after the landing, consist of two series of observations, one for the longitude-determination and one for the determination of latitude, which, under the same presupposition concerning the chronometers, also give a good position-determination.

In addition to the observations just mentioned, additional ones were taken during the balloon journey, a number of which, in consequence of incomplete data, could not be calculated immediately (time has not allowed of their calculation in respect to the varying assumptions that may be made); others again, it is clear, have been taken under such unfavourable circumstances that they ought probably to be considered as less reliable.

After calculating the above-mentioned observations, one has, for the purpose of orienting the route-curve, three fixed points, A, D, and E, and two movable ones, B and C, of which the first is displaceable in an east and west direction, and the second in a direction lying north and south. Between these fixed points and those which are to a certain degree displaceable, the route-curve has been drawn, supported by the statements respecting course and speed, and the retention of the refraction-angles of the course-lines and their relative lengths. The declination valid for the year 1897 has been calculated in accordance with the statements in Reichs-Marine-Amt's isogonic chart for 1920.

The Journey Across the Ice

In contrast with the balloon flight where certain statements respecting course and speed, even though unreliable, have served as a guide, for determining the route of the journey on the ice we are referred exclusively to the astronomical observations taken during the march. It is true that we are not without statements as to the variations in the course that the expedition endeavoured to follow during the different phases of the journey, or estimates of the distances traversed in the direction of the course; but the conditions of wind and current have, to a preponderant degree, been the determining factors of the speed and direction of the actual line of march. As the action of these factors altogether escapes our analysis, a place-line determined by means of astronomical observations cannot be transported to a known distance in a known direction, corresponding to the change in the position of the expedition between the observations, in order, in conjunction with another similar place-line, to determine a point in the route-curve. Only in those cases where two observations have been taken at an interval of only some few hours and which, consequently, it is possible to regard as having been executed at the same point, have relatively reliable positions been determined. In the large "Map of the Route Taken by the Andrée Expedition," such places are marked with double circles. Other points are more or less unreliable. These are marked with a single circle with a line through it giving the direction of the place-line. The latter, therefore, represents *the line* on which, or on the extension of which in one direction or the other, the observation has been taken.


5°
10°
15°
20°
25°
30°
35°
0
50
100 KM
E
H
B
D
C
I
F.
A
G
82°
81°
80°
Gillis land enl. kapt. Gillis 1707
Land siktat? Worsley 1925
Vitön
NORDOSTLANDET
15° E. fr. Greenw.
20°
25°
30°

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MAP OF THE BEARINGS TAKEN BY ANDRÉE EXPEDITION

As regards these place-determinations, the different periods of the trek over the ice differ to a great degree. During its first phase frequent determinations were taken, and great care was paid to the work. During this part of the journey there are, in many instances, double and even treble series of observations. During the latter part of the march the observations become fewer and briefer, possibly as a result of cloudy weather, and sometimes a single "half-series," has had to serve in determining a place-line.

In addition to this, it should be noted that the observed solar altitudes at that advanced season of the year become lower and lower, amounting, in some instances, to no more than about 3°. The refraction conditions, in the polar tracts often abnormal and entirely incalculable, make these low height-angles and, in a corresponding degree, the place-lines calculated by their means, very unreliable.

On August 19, when in spite of the south-westerly course the daily observations gave an increasingly easterly longitude, Strindberg began to suspect the chronometers.[1] Undismayed, he at once put to use the now almost forgotten method of old seafarers, who checked the movements of their timepiece by measuring the lunar distances. These precarious observations and lengthy calculations have, ever since the days of Gemma-Frisius, been considered the most difficult and troublesome in the sphere of nautical astronomy, and, under the existing conditions, Strindberg's attempt is nothing short of marvellous. On August 22, when the weather was especially favourable, Strindberg repeated these observations, this time with redoubled keenness, and obtained a result which bears witness to a respectable skill in taking observations. The mean error of the observed distance is only 3.5"!

Thanks to these lunar distances and to a time-angle observation taken on September 19, simultaneously with the tangential-bearings of White Island, it is now possible to have a fairly good idea of the movement of the chronometers, and on this basis to determine the true course of the journey across the ice in regard to the longitude, i.e., in an east-west direction.

The geographical co-ordinates for White Island have been obtained from Commander Worsley's *Under Sail in the Frozen North* (London 1927), which is probably our most reliable source at present. These co-ordinates, supplemented by Dr. Horn's statements as to the form, size, and orientation of the island, and by A. G. Nathorst's chart of the year 1898, have served as directives in drawing the schematic contour of White Island.

On the above-mentioned co-ordinates, and on the observations of lunar distance at point F, have been based all the longitude-determinations from August 22 to September 19, both days inclusive (G). Other longitude-determinations during the balloon flight as well as during the first part of the march are based on a comparison between the *Svensksund's* chronometer, evidently a very good one, on July 11, and the lunar distances on August 22 (F).

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[1] He had good reason for this, for even during the long period of waiting at Dane Island their movement had proved to be far from regular.

The average difference in longitude of 0.5° which appears on a comparison with Strindberg's map of the march results from an error made in his calculation of the lunar distances.

As was mentioned before, the place-determinations are in many instances unreliable, and, in consequence, the route-curve can give no more than a very schematic and even a misleading picture of the route followed by the expedition. The little turn northwards above point H, for instance, *may* have been caused by the abnormal conditions of refraction prevailing during the midnight observations of August 2–3 and, in that case, would have no correspondence to any actual movement in that direction. Failing the support of an astronomical longitude-determination, point I in the balloon curve may have lain more to the east or more to the west. The same may be said of a great many points in the curve of the journey across the ice.

It is possible that further scientific treatment of all available material will give us a more detailed and exact picture of the course followed by the Andrée Expedition across the Polar Sea.

Part Five

THE DOCUMENTS

Andrée's First Diary

Undecipherable portions are indicated by dots. . . . The manuscript has been followed line by line for the first 31 pages of the diary. Thereafter the text has been set in paragraph form. Words between brackets [ ] are such as have either been altered or inserted by the editors. Otherwise the original text has been followed without change of form or substance except when necessitated by the requirements of translation. This final version omits calculations and marginal jottings concerned with place-determinations.

Inside Dispatch, July 11 . . o'cl.
of . buoy . . . . .
Cover Our journey has . . . . .
. . . .
continues at . . . . .
ters' height . . . . .
at first . . . . .
due course but . . . . .
towards N 45° east . . . . .
Four carrier-pigeons sent off
5.40 p.m. Greenw. time
flew westwards. We are now
in over the ice which is
much divided in every
direction. Weather magnificent
Best of humour
Andrée Strindberg Frænkel

Page 1 July 11
Psychr . + 2.3 7.31 p.m. [psychrometer]
. . . . . work at
. . . . . the rope
. . . . . guide-rope
. . . . . acting

. . . . . steering arrangement
0.2 + 0.2 July 11
. . . . . o'clock
at 40 m [130 ft.] height
barom. 448.2 mm [17.479 in.]
5567 is then 51m 45s before Gr. M time

Page 2

Dusén's barom 748 m.m. [29.162 in.]
At 35—height [115.5 ft.]
night between July 11–12—10
G.M.T.
4.43 a.m. July 12
acc. 5567 speed 0.4 m [15.6 in.] per sec.
and direction . . . . . ° W. magn
4.50 o'clock . . . (temp. ± 0°) [+32° F.]
psychrom. ± 0.0 + 0.1
fog lightens a little and
the balloon is rising
much of what we have taken for
open water was probably
only snow-free and
water-covered ice
4.55 o'clock (5567)
movement continues incessantly
course N 25° W magn.

Page 3

at 5 o'clock I thought I heard an auk
and I saw a fulmar circle
. round us. He was not afraid. On
. . . . . middle of back edge
he . . . . . two white patches
and the beak or front part
of the head was black.
course . . . . . 5.05 o'clock (5567)

The snow on the ice a light, dirty yellow across
great expanses. The fur of the polar bear has the same
colour. The ice shows few, or, more correctly,
no signs of hummocks. A horse and sledge could

drive over it if the surface is hard.
No land in sight. The horizon is
not clear however. It is indeed a wonderful journey through the night. I am cold but will
not wake the two sleepers. They need
rest. We have still . . . . .

Page 4

any bear or seal. When
the balloon descended, the ropes
did not lie right and this
makes the car
swing backwards and makes the sails
press down the balloon. This
is a pity for . . . . . does not
considerably . . .
Speed 0.8 m. [31.2 in.] 5.20 o'cl.
course N 50° W. magn.
5.48 o'cl. (5567)
speed 0.32 m [12.48 in.]
the course then N 60° W
magn

Page 5

July 12
6 a.m. there was taken the first photograph of
5567
great seal (walrus?) two
of them were seen . . . . .
. . . . . One of them grew frightened
the other not. The ice is traversed by leads of open water
. . . . . o'cl. . . . . . o
Psychrom. + 0.2 + 0.2
Course N 80° W magn
The car now often descends to 15-20 m [49.5-66 ft.] height.
speed 6.18 o'cl. 5567
= 1.4 m/s [4.64 ft.]
the sky is evenly clouded

and has been so ever since
I was called at 2 o'cl.
6.50[1] the balloon stopped
(5567) 7.10 it still remained motionless
Psychr. + 0.6 + 0.5 7 o'cl. .

Page 6

Morning July 12
7.15 o'cl. a fulmar visible
quite near the car
The balloon not free
before 7.32 o'cl. (5567)
and then went direct to W.
magn
Coffee made in 18 min.
Sucked the can-opener
fulmar shower of peas

Page 7

July 11, 22.05[2] Gr. M.t.
(astron)
Course N 75° W magn
Speed
Ice much divided, everywhere
much open water
5–6 p.m. the 12
5567 The ice more hummocky
sometimes rather
8 touches in 30m much
5567 "at least be allowed to eat in peace."
6h15 long water-lead
N—S
2 touches in 30 min.
magn
Course S 70° W. 6h 33″ o'cl. 5567
speed 3.3 m. [10.9 ft.]
psychr. + 0.5 + 0.6
Hummocks. No regular
direction

---

[1] 7 altered to 6.
[2] 4 altered to 5.

Page 8

July 12 p.m.
mag. S 75° W Magn 6h[1] 58
5567
magn. S 75° W 7h25 5567
incessant fog and
bumpings every 5th minute
Humour good
magn S 80° W 7.03 o'cl.—5567
here and there many hummocks.
magn S 75° W 7.54 o'cl. 5567
speed 3.2 m [10.56 ft.]
Ice coarser and more
pressed than before
fog 8h28
Bad surface (ice) 5567
magn Course S 70° W 8h45
5567
speed 2.5 m. [8.25 ft.] per aec.

Page 9

speed 3m [9.9 ft.] per s. 9.05 o'cl.
5567
mg S 60° W 9.35 o'cl. 5567
Ice smoother
fog still dense
1.75 m [68.25 in.] per sec. 9h45 5567
mag S 60° W 10.30 o'cl. 5567
touch every minute or every other minute
paid visits to the surface and
stamped it about every 50 meters
10.53 the balloon stopped
with a wind velocity of 4.5 meters [14.85 ft.]
11.45 o'cl. Psychr. + 0.5 + 0.5 Everything
is dripping and the balloon
heavily weighted down

Page 10

Although we could have thrown out ballast, and although the wind might, perhaps, carry us to Greenland, we determined to be content with standing still. We have been obliged to throw out a great deal of ballast today and have not had any sleep or been allowed any rest from the repeated bumpings, and we probably could not have stood it much longer. All three of us must have a rest, and I sent Strindb. and Fr. to bed at 11.20 o'cl. (5567) and I mean to let them sleep until 6 or 7 o'cl. if I can manage to keep watch until then. Then I shall try to get some rest myself. If either of them should succumb it might be because I had tired them out.

---

[1] 7 altered to 6.

It is not a little strange to be floating here above the Polar Sea. To be the first that have floated here in a balloon. How soon, I wonder, shall we have successors? Shall we be thought mad or will our example be followed? I cannot deny that all three of us are dominated by a feeling of pride.

Page 11

We think we can well face death, having done what we have done. Isn't it all, perhaps, the expression of an extremely strong sense of individuality which cannot bear the thought of living and dying like a man in the ranks, forgotten by coming generations? Is this ambition?

The rattling of the guide-lines in the snow and the flapping of the sails are the only sounds heard, except the whining in the basket.

The aneroid 743mm [28.977 in.] at height of 30 m [98.4 ft.]
morning July 13 1.20 o'cl. 5567
(3rd day of journey)
Velocity of wind 2.68m [8.84 ft.] per s. 1h 20 d:o
The wind is *northerly*
July 13 Psychr. + 0.3 + 0.3 2.08 o'cl. 5567
The balloon sways, twists, and rises and sinks incessantly. It wishes to be off but cannot for now the wind is only 2.1 m. [6 ft. 10 in.] per sec. now i.e., 2.10 o'cl. (5567)

Page 12

Psychr. + 0.3 + 0.3
vel. of wind 3.0 [9.9 ft.]/s
dir. of wind N 40° W magn
4.15 o'cl. 5567

Not a living thing has been seen all the night, no bird, seal, walrus, or bear.

Lat. 82° 2′ } east at 2nd resting-place
Long. 15° 5′ }
July 13, 11.49 o'cl. the balloon came free
Frænkel looking greedily
for water to clean dishes
1h 37 5567 bear-tracks
rigging iced
4 carrier-pigeons (3rd post)
sent 2 p.m. July 13 (5567)
The birds first of all settle on the instrument-ring and guide-line.

Page 13

July 13
Course S 75° 6.15 p.m. 5567
speed 2.2 m. [6.6 ft.] 6.35 p.m. 5567
Course S 85° E
constant bumpings violent
d:o fog
The ice as usual easy to traverse as far as *smoothness* is concerned but the cracks !
7.0 p.m. fire in the car
Course E 20° N 7h 18 o'cl. 5567
speed 0.9 m. [2.97 ft.]
course E 20° N 7.30 o'cl. 5567

No bird is seen or heard and so I suppose there is no land near.

I received a hard blow on the head from [?]
The balloon contains much gas, it has fallen in only up to 1/3 of the band

Speed abt. 2.0 m. [6 ft 6 in.]
Course E 20° N 7.50 p.m.

Page 14

8 o'cl. Strindberg seasick
magn N 60° E 8.55 o'cl. 5567
Course N 80° 9.04 o'cl. after the sails had been set athwart and made taut

Course N 70° E 9.24 o'cl. 5567
speed 2.4 m. [7.92 ft.] per sec.

Until this moment the guide-lines have not left the surface since the first high-level journey was made.

The sails now lie athwart. They carry excellently and increase the speed.

The balloon goes extremely beautifully now the sails have been set so and 50 kg. [110 lbs.] of ballast have been thrown overboard. Altogether it is quite stately.

Page 15

magn
Course N 60° E 10.28 p.m. 13 second day of journey
accord. 5567 speed 3.0 m. [9.9ft.] speed
10.41 o'cl. an immense polar bear swam about, 30 meter (98 ft.) right below us. He got out of the way of the guide-lines and went off at a jog-trot when he got up on to the ice. He did not try to climb up to us. Now at 10.49 p.m. 5567 we ought to have travelled abt. 120 kil [75 miles] N 60° E approx. due course i.e., 60 kil. [37 miles] northwards and 105 kil. [66 miles] to the east so that our position now is 82° 35′ N and with abt. 15 kil [9 miles] pr long. degree 22° 5′ east.
Through the fog the ice and water are visible lifted up along the line of vision and the water is consequently bewilderingly like land. It has deceived me several times.
11.00 The ice beautiful and smooth. It is certainly not half a yard thick for it is lying very low.

Page 16

11.09 An east-west powerful line of hummocks
Course N 60° E 11.49 p.m. 5567
big hummocks
July 14 speed 1.8 m. [5.94 ft.] 0.20 a.m. 5567
July 14
Our long guide-line has now broken off.
Constant fog. No land and no birds, seals nor walruses.
Course N 55° E 0.34 o'cl. (5567)
The ice easily traversed if there were no water on and between the floes.
An immense lead running N–S was passed at 0.42
+0.3+0.4 Psychr. 0h50
—0.1 correct.
Aneroid (Dusén) 749 [29.211 in.] at 40 m. [132 ft.] height.

Page 17

Dense fog and

much "open water." But still no
great expanses of water
Course N 60° E 1.02 a.m.
5567
speed abt. 3.3 m. (10.08 ft.) per sec.
Course N 55° E 1h 20 5567
One of our pigeons flies around us now. Perhaps
it has done the same as
Glaisher's pigeon?
Magnificent, smooth ice 1.50 o'cl.
Monotonous touch new touch
another touch
Bear-tracks at 2.06 (5567)
82° 18 } 2.11 o'cl. 5567
23° 40 }

Page 18

2.25 o'cl. adjusted the steering apparatus
at its maximum southwards
Course N 80° 3.15 a.m.
immediately after the side-sails had been cut loose
July 14
Course N 65° E 4.27 o'cl.
Course N 55° E 6.05 o'cl.
6.20 o'cl. the balloon rose to a great height
but we opened both valves and were
down again at 6.29 o'cl.
8.11 p.m. we jumped out of the balloon.
The landing
Worn out and famished but
7 hours' hard work had
to be done before we could take our recreation.

Page 19

The Polar ice wears out the ropes more than our exper. shows.

Pages 20-21-22
unwritten

Page 23

the 14th
the 15th we spent at work.

Pages 24 and 25
unwritten

Page 26

Simultaneously with what follows below, Strindb.
took observations with the altazimuth and
found 13° 12.5′ (at bulb) consequently
exactly the same values.
(See above) *Tests of obs. with level sext.* [omitted here.]
$\frac{20}{7}$ – $\frac{21}{7}$ midnight

Page 27

July 15, 10.55 a.m. 5567 all in movement and we determined to set out from the point where we were. In the air there is visible a steady *fine* drizzle which gives a good explanation of the fact that so much ice was deposited on the balloon.

July 15 1 auk flew towards S S W
1 fulmar visible
the first bear

Calm
the whole
day

Thickness of the ice=1.07 mtr [4.2 ft.] (only below the water)

1 fulmar chased away 1 pigeon.

Velocity of wind 4.80 [15.84 ft.] dense fog as usual Temp. +0.2 + 0.4 [32.45° F. + 32.72° F.] humidity direction of wind N 60° W.

Direction of clouds the same. Boat-work, burgomaster gull—

Page 28

hummocks. In the evening slight snowfall, not large flakes. At 12 o'cl. at night before July 17 it snowed.

At 18 a.m. seals and fulmars pretty long sight but no land visible in any direction.

Cakes of ice are formed at the transition between fresh and salt water at the ice-floes. 0.6 m. [23.4 in.] below surface of the water.

20/7 [July 20] at 2 p.m. the netting-strings had sunk 132 mm. [5.15 in.] deep into the snow and ice. The snow layer was about 75 mm. [3 in.] deep.

At 6 o'cl. my bear came from N E. In the morning all the pigeons had flown away.

Page 29

At 8 o'cl. a little auk visible on the east side of the camp.

Twice I examined the horizon carefully in every direction without discovering land.

The bear-carcass was floating in the half melted layers. Two fulmars came only ½ an hour after cutting up.

Excellent pumpernickel. 1 great auk in the water beside us. Became frightened and flew off towards N N W.

Test of level-sextant with exc. result. We managed to get some things dry.

21/7. loading the sledges. The boat in the sea—extremely good result 4.30 p.m.

Nisse fried the bear's meat excellently on "primus."

Do you want to wash yourself, Nisse? Wash myself? No, I washed myself the day before yesterday. What is left is that kind of dirt that sticks on by itself.

Page 30

22/7 6.45 p.m. break camp. Nisse's sledge turned over and lay there in the water. 4 h. march. Night camp. Sunshine beautiful ice. Transp. on ice-floe on large scale. Ice-humps. 23/7 break camp 2 p.m. Difficulties at once. Astr. obs. meteorol. Follow bear-tracks. Ferrying across with the sledges extremely risky. 4 great auks 2 burgomaster gulls 1 fulmar. Weather misty and windy. Snow moister. The leads more difficult. The ice-humps inconsiderable. Ice on the pools. Tenting at 11 p.m. in lee of a big ice-hump. Nisse's cooking exp. bread, rousseau, butter, peas, soup-tablets. Hammarspik's poems. 24/7 broke camp 2.10 o'cl. several bad leads and ice-humps. The travelling bad and we were extremely fatigued. Dangerous ferryings and violent twistings, etc. of the sledges among the hummocks etc. Followed the edge of a large lead almost the whole time.

Page 31

Fulmar great auk ivory gulls, seals (unafraid), cod-fish heads (Cranium). Good weather for pulling. Coffee extra enjoyment in the evening. Syrup bottle; Nisse dripped it out, Andrée rinsed twice and F. then tried to get another taste of the syrup out of it unnoticed. The salt water in a pool on the ice. The lanes of water on the ice troublesome. Fear of non-durability of material. Question of lightening the load but no decision. Camp 12.30 p.m. on good solid snow. Fourfold hurrah for N's[1] sweetheart when July 25 broke. Division of work of putting up and taking down tent.

During the rest that followed hard shocks were felt against the ice-floe although this was at least 1km. [1100 yds.] in diameter.

7/25 Breaking camp delayed by rain. New method of travelling: along leads and on smoother ice, wet snow and bad going. Gull with red belly. Wings blue underneath and above. Dark ring around neck. Seals often in openings, never in flocks. Talked rubbish about seals. Nisse fell in and was in imminent danger of drowning. He was dried and wrung out and dressed in knickerbockers. Stopped short at a lead.

Page 32

Load on my sledge the 26th on (before) altering load:

	Kilo.	[*lbs.*
4 ice-planks	8.50	18.7
3 bamboo-p[oles]	2.00	4.4
1 carrying-ring plank	1.00	2.2
1 boat-hook	1.50	3.3
1 bottom-tarpaulin	1.00	2.2
1 sack private	17.5	38.5
1 △ basket	29.00	64.
1 pot boot-grease	3.5	7.75
1 hose	3.5	7.75
1 large press	8.00	17.5
1 shovel and 1 reserve cross-piece	1.8	4.
1 basket with contents	65.00	143.
1 do.	66.5	146.
	208.8	459.3
Grapnel with rope	2.00	4.4
	210.8	463.7]

Page 33

The 26th at 6 o'cl. p.m. we began with the rafting. 1 big & 1 little bear visit during night around the tent. Northerly wind, hurrah. Place-determination Long. 30° 15′—30° 47′ and Lat. 82° 36′. Strindberg's bear. Bear-beef immensely good. Meat 1 hour in sea-water then all well. Sledges broken. Iron-sheathing as experiment. Mending and examination of weight and considerable reduction. Revision of plan of journey. No time for sledge-pulling. Equipment for 45 days. Strange feelings and great indulgence in food on making reduction. To sleep at last about 7 a.m. on July 27.

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[1] Nils's—*Trans.*

4 p.m. July 27. 4 p.m. broke camp, altered packing, repairs etc. A bear was shot by F. with a beautiful shot at 38 m. [124 ft.] distance. Whistle and hunting-horn did not frighten it. Skin for mending sleeping-sack. Meat, meat-powder, and the like reduced and more bread taken. Four hurrahs for Sw. flag ball. flag. At 12 o'cl. we started and passed 14 leads. 1 with compl. rafting and 2 with pushing across [?] the boat. Impossible to move the pieces of ice. Thin ice cut into the boat and made rowing almost impossible. The eaten-away edges had fortunately become firmer. The surface extreme. difficult on account of the leads and ice-humps but still we were satisfied with our day when at . . . a.m. on July 28 we at length crept into our sacks after a day's work that had been extremely fatiguing especially for F. Strindb. sledge . . . . .

Page 34

Load on my sledge 27/7 [July 27] *after reload:*

1 basket provis[ions]	41.00	[90.2
1 do.	52.5	115.5
1 sack private	15.5	34.1
1 do. ½ private	3.5	7.7
	112.5	247.5
1 medicine-chest	9.00	19.8
	121.5	267.3
1 tent	8.00	17.6
	129.5	284.9]

Load on Frænkel's sledge:

Boat	63.00	[138.6
1 sack private	17.00	37.4
ammunition	17.5	38.5
altazimuth	3.00	6.6
stand (for) do.	1.5	3.3
div. instr.	8.00	17.6
div. charts etc.	3.1	6.8
1 photogr. app.	0.8	1.7
1 cooking-stove	4.00	8.6
1 field-glass	1.2	2.6
3 blankets	4.5	9.9
sleeping-sack	9.	19.8
Tent	. .[1]	/
matches	3.00	6.6
	135.6	298.3]

Page 35

Frænkel's sledge . . . . . they were broken. The wind N 25 . . . . . made us happy, for we hoped we were drifting. Direction of the leads seemed to extend mainly about SSE –NNW. . . . . . on bivouacking ate in the tent. Champagne, biscuits, and honey I swept the tent with the straw cap of the champagne bottle. Senne grass[2] between the stockings. Even Frænkel complained of fatigue.

July 28 8 p.m. turned out. Sheathing sledges. Begin with snow-shoes. Repair of Frænkel's gear. Paradise: large smooth ice-floes without humps or leads or more melted-snow water than was needed for drinking. *"Parade-ice."* Fr.: "What old mother nature sends us is pretty good after all." Terrible under foot to begin with but in the evening magnificent ice and magnificent weather. The wind is felt much but is always welcome when it drives towards S E. Today we have crossed a number of bear-tracks but not a single lead. Now however we have come to a broad beast which we must
Page 36 get . . . tomorrow. Now we have turned in 12 o'cl. noon the 29 after having thus been at work 16 hours. We learn

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[1] Crossed out.—*Trans.*

[2] *Molinia cærulea,* a grass used dried by Laplanders in their shoes.—*Trans.*

the poor man's art: to make use of *everything*. We also learn the art of living from one day to the next.

Describe in detail. Difficulties with the ice, the ice-humps, melted snow-water, the sludge-pools and the leads and the floes of broken ice.

The 30 at 2.30 o'cl. in the morning start. The night rainy and blowy. A specially laborious day. A number of leads were crossed in accordance with all methods. The ice between the leads good so that we made some distance however.

We found our berths at 3 p.m. altogether tired-out. I flopped into the water. Nisse among [?] Mellin's food wet. Fr. asked what was up and on being answered dessert said jolly then it must be eaten. Fr. first signs of snow-blindness. The ice very deep. Nisse washed one hand with a wet stocking but found the work so difficult and time-wasting that he let the other hand be. The difference was like that between a mulatto and a nigger.

Today we have held course E and mean to continue it as *Page 37* we drift almost direct S with a slight trend to W. Joking about reindeer-hair[1] everywhere. Lose one you find a thousand. Silver fork. Alum. heels. The day usually begins with greasing shoes. I reconnoitre after the beds in the tent have been done up and the table has been laid. Frænkel met. obs. and oiling guns making sandwiches and laying table. Nisse boiling and frying the food. Bear-steak twice daily. Fr. = housemaid and Nisse = kitchenmaid.

31/7 5 a.m. Start. "Tramp" on our knees in deep snow. "Tramp—tramp" on our knees. Discoverer of joys of flopping = Nisse. Cut our way. The constant mist prevents us from choosing good road. Ever since the start we have been in very difficult country. The Polar dist. is certainly the source of the idea of the stumbling-block. 10 leads during the first 6 hours. Thickn. of the ice 0.8 m. [31 in.]. An immense belt of pressure-ice a couple of kilometers [2200 yds.] wide running in a direction from N 10° W.

31/7 at 6.40 p.m. we crept into the sack. In the evening we at last got clear of the pressure-belt and made a good distance eastwards. We now hear a murmuring noise as from a sea.

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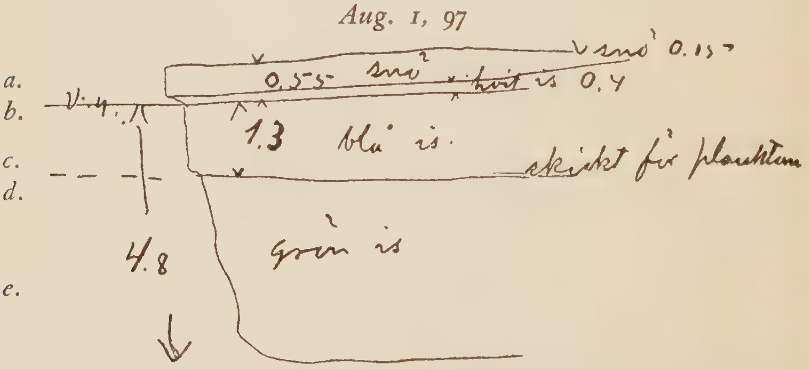
[1] From the sleeping-sack.—*Trans.*

Lat. 82° 22′ Long 29° 12′
both of them good determinations.

Page 38 (Depths of ice below water 4.1 m. [13.53 ft.] The melted snow-water on the dirty ice or surrounded by dirty ice did not taste so insipid as pure melted snow-water. Slight taste of clay.) These values show that we have driven westwards quicker than we have walked eastwards. This is not encouraging but we shall continue our course to the east some time more, as long as there is a bit of sense in doing so. Red-breasted gull[1] visible. Clay in quantities, in the shape of small grains up to the size of a walnut (rare). We arrived at a lofty pyramidal mass of ice but from it could see neither land nor sea. Half-frozen and snow-covered little pools very treacherous. Humour and spirits good. Out on the ice one cannot at all notice that it is in movement except that at our resting-places the leads change while we are sleeping. Towards the evening we followed a fresh track after a large bear. He had gone down in the soup[2] a couple of times so that not even he is above making mistakes in this regard. During the last few days we have seen no other birds than the one mentioned above and an ivory gull and a few fulmars. The water is [filled] with sponge-like masses. *Page 39*

The ice has usually a 10–20 cm.—[4–8 in.]—thick snow-cap and the ice below the clay is always hard (in block)



a=snow, *b*=white ice, *c*=blue ice, *d*=layer for plankton. *e*=green ice. V.y.=surface of water.

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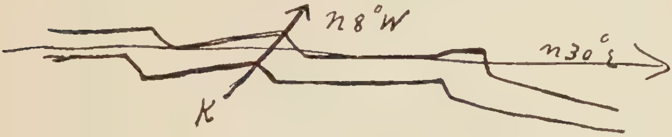
[1] The red-breasted gull often mentioned by Andrée is the Ross's gull.—*Trans.*

[2] Andrée hardly ever uses the word "water" even when he means "drinking-water." He employs the term *"soup"* instead. This makes it difficult to know the character of the waters in the pools and leads, etc., and to know whether the water be clear, or sludgy, etc.—*Trans.*

a) 1 lead N 40° W
b) 1 do. N 30° E

1 ice-thickness 1.35 [4.6 ft] below water, in lead b the fissure had the following appearance



In an adjacent lead K lay N 60° W. We started on Aug. 1 Sunday 8.30 o'cl. after I had mended the sleeping-sack with bear-skin. We had excellent good ice until midday but then we had an hour's hard work after which the ice again became good. Our distance was probably 7 kilom. [4.2 mile] at least. Three red-breasted gulls seen and two of them fairly unafraid unlike what has previously been the case.

The ice seems to have become of a more favourable character, *Page 40* perhaps because we are approaching the edge of the great ice-stream and our territory lies to leeward of the tide-water under Franz Jos' Land. Today, for instance, we have not needed to use the boat once for crossing lanes, these having been narrow and very often with even edges etc. Fulmars and seals were often seen. Two fresh bear-tracks have been crossed and we are longing for bears for the meat is finished. This evening we have seen the back of a new animal which looked like a long snake 10–12 metre [33–39 ft.] long of a dirty yellow colour and, in my opinion, with black stripes running from the back for some distance down the sides. It breathed heavily almost like a whale which I suppose it really was.

Stockings are dried best by putting them on over the wool-and-hair stockings [*raggsockor*] on the feet. At our meal-times the seats consist of 1 medicine-chest, 1 photographic apparatus and 1 case of matches. For some days back I have greased my hands with bear-fat and in that way keep them soft.

Chronom. 5567 Aug. 1. Corrected to Gr. Mt = 50m 7s it probably loses 4.7 sec. every 24 hours.

Aug. 2 we awakened 9.30 o'cl. more tired than usual. It seems as if good country were more fatiguing than half-good.

Page 41 Aug. 2 at 12 o'cl. midd. we broke camp. The last bear-meat was cut into small pieces so that it might at least *look like* being a lot. Thickness of ice 1.2 m. [3.96 ft.]. Scarcely an hour after breaking camp we got a new bear. It was an old worn-out male animal with rotten teeth. I brought it down by a shot in the chest at a distance of 38 m. [125 ft.] S–g and Fr–l both fired outers. Clear calm and hot the whole day but the country extraordinarily difficult. I do not think we made 2 km. [2200 yds.] in 10 hours. Axe destroyed. 1 skua visible and 2 gulls circling around the body of the bear. We did not get into our berths before 2 a.m. Aug. 3. I washed my face for the first time since July 11 and in the evening I mended a stocking. We hope that one bear will be enticed to follow us by the remains of the one shot, and so on so that we shall always have fresh meat at our heels. This time we took from the one we shot the fillet too (close in to the back) and the kidneys—1½ kilo. [3 1/3 lbs]—and the tongue and ribs. Aug. 3 at 12 o'cl. we rose after being much plagued by the heat in the tent. We have determined to "lie outdoors" today. We photographed the story of the evolution of our forks. It is so warm that we do the pulling without any coats on. The ice horrible. Clothes-drying on a large scale. I made a fork for Frænkel. The forks photographed.

Page 42 Aug. 3 4.45. Driftwood on the ice. 1.1 m. [43 in.] long. Towards the water it is seen that the air is filled with a fine rain of water or particles of snow.

Freshwater-floe thickn. 1.4 m [54.6 in.]

"Is it easy to get across?" "Yes, it is easy with difficulty." Extremely difficult ice small floes much pressure and new ice in the leads. The only advantage of the cold is that the edges hold better. Yesterday and today the course has been more S E than E. for that course is usually impossible. A skua was

Page 43 observed and a gull. A red-breasted gull visible. Much joking about my old bear which F. declared was the oldest bear in the Polar regions. Tough as leather galoshes. He believed it was an escaped menagerie-bear. We have passed tracks of 1 bear with 2 cubs. 2 a.m. Aug. 4, with the field-glass and in extremely clear air I looked N-E-SE for land or water without being able to notice either. Only ice and very difficult ice visible in all directions. In consequence we determined to abandon our efforts to move eastwards.

(Long. 29° 43′ and probably lat. 82° 17′ Decl. 0.8° west)

We can surmount neither the current nor the ice and have absolutely no prospect of doing anything by continuing our tramp to E. We have therefore decided to begin our next next march in the direction of the Seven Islands which we hope to reach in 6–7 weeks. At 4 a.m. Aug. 4 we turned in. Bread and biscuits etc. wet through. N. B. that the movement of an ice-floe in one direction made the stomach feel empty. The great stream that Nansen has shown to exist thus produces perhaps quite other directions of currents in the neighbourhood.

Page 44 Aug. 4 3.30 p.m. break camp. Alga sample (no. 3) on ice-foot (green ice-foot but not at a depth of more than 0.5 m. [19 in.] below surface of water). Thickness of ice 1.05 [41 in.]. Often the most practicable crossings lie at the ugliest hummock, the edges of the leads being nearest each other there. Of course these bridges are terrible but still they are bridges. In a lead running N 40° W we saw a hummock direct towards the channel. Wide leads free from floes but with piled-up edges all around are the very devil. But as long as there is no fog we can get along.

Invent. of provisions.

Aée front basket		
Coc. powder extract	4	tins
coffee	1	"
butter	5	"
milk	8	"
lact ser [dried milk?]	4	
bread	4	"
sardines	5	
bird paste	1	
cheese	½	

Aée rear basket	
3	Snowflake[1]
2	mellin's food
5	biscuits
2	bottles
4	butter
1	pastry
2	salt
2	soup tablets
1	flour
1	lactoser.

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[1] Paraffin used as fuel for the stove?—*Trans.*

Alga-sample No. 4 was frozen into the new ice in an opening.

Page 45 *Stock-taking of provisions Aug. 5 in morning.*

Hardtack . . . 11 b. [oxes] of 1.1 [2.4 lbs.]	12.1 [Kgms.]	[26.4 lbs.
12 biscuits . . . 12 b. of	15.5	34.1
+ 5 Mellin's food	15.00	33
butter . . . 17 b. of 900 [2 lbs.]	15.30	34
Chocolate powder . . . 9 b. of 1 [2.2 lbs.] extr.	9.00	20
milk . . . 10 b. of 250 [½ lb.]	2.5	5
Lact ser. . . 10 b of	2.5	5
Pemmican	3.0	6.5
Sugar	5.00	11
1 tin Stauffer prep	4.5	10
Coffee	2.00	4.5
1 tin chocolate		
3 b. Lime-juice tablets		
Whortleberry jam	1.00	2.2
9 tins sardines		
3 tins paste		
Soup tablets 3 ½ tins		
2 bottles syrup		
1 bottle port-wine		
6 Snowflake		
flour	1.	2.2]

This stock-taking shows that we must be careful, especially with the bread.

Page 46 Temp. falling still lower and each degree makes us creep deeper down into the sleeping-sack. Bad day today the first with course N 40° W = Seven Islands.

The 5th 8.30 p.m. start. Course S 40° W. Thickness of ice (fresh-) 1.2 m. [47 in.]. Some drops of rain fell. On all fours today as in the spring of our youth. "Glassy ice flop" or "flop-flop." The ice much divided. A rafting of more than 1 km. [1100 yds.] 4 hours. Thickness of ice 0.7 m. [27 in.] Thickness of ice 1.1 and 1.2 m. [43–47 in.]. Great seal on the ice. Many bear-tracks. Fulmars. 1 red gull. The ice after rafting first fairly and afterwards extremely good. At 6.30 a.m. Aug. 6 we stopped. Lat. 10 a.m. G.M.T. 82° 10′ 7″. Short ribs of bear and tongue. Paradise. Large level ice-floes with fresh-water pools full of syrup and water and here and there a young Polar bear with tender meat.

The 6th 11 p.m. Start. Ice 1.6 m. [5.28 ft.] mild. 2 red-breasted gulls. Shy. Visit once and then fly. Ice exc. favourable large level floes and many but easy crossings. What joy when the needle pointed across a level—some hundred metres.
Page 47 1 pressure-line lead N 25° W. When we [and] the sledges made the worst somersaults F. remarked that the journey once more could not be called altogether hopeless.[1] Powdered-sugar ice and ice-gravel. Greatest distance of all probably at least 3 minutes but the wind is almost right against us and has probably driven us just as far back.

Two red-breasted gulls. The bear-meat is very good when it has become old. The snow difficult so-called powdered-sugar snow. One's feet glide and one easily slips, while the sledges cut deep into the snow. We are very tired now as we go to our berths at 12 midday of the 7. The wind is S 55° W and our course is S 40° W. New difficulty: the leads altering while we are crossing them. At 10.30 p.m. of the 7 we wakened at last and felt ourselves fully rested. The wind was still fresh but had swung round more from the west (S 75° W). *A little* reindeer-hair in the food is recommended for while taking it out one is prevented from eating too quickly and greedily. 2 a.m. the 8 break camp. Ice 1.45 m. [4.75 ft.]. Pretty good ice. Ice-humps and leads but large floes. The wind right in our noses but it is cooling. The ice has been about the same almost for the last three days. I do not use spectacles excepting in bright sunshine. I squint instead.
Page 48 Two little auks visible in the water. They made a sound I have not heard before. If the wind fr. S W does what it has done before, i.e. closes up the leads, then it can keep on for a week or two. I wish I had a summer jacket. It is warm work pulling the sledge. 2 red-breasted gulls. For a change we have come into a dreadful country with fresh water (photogr.) but F. who otherwise complains of the want of

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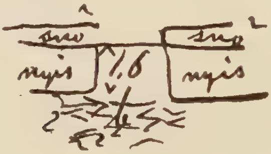
[1] In Swedish a passable pun: hop-less.—*Trans.*

change, did not like what was offered him. All three of us have our noses running constantly. A permanent catarrh. The fresh-water pools are often more difficult to pass than the salt-water channels for their edges are eaten away below and the depths are so slight that the boat cannot be used.

Aug. 9 at 2.20 a.m. we began to get up in the tent.
3.00 primus started
3.18 the steak ready and the coffee-making begun
3.29 the steak eaten
3.48 the coffee made
4.00 the coffee drunk
5.30 broke camp

[snow]
[new ice]



b = ice-sludge that looked like old ice. One

Page 49 must not let oneself be fooled by that. The state of the country is dreadful. The country consists of ice-humps blocks and hills with snow-drifts between and this is difficult for the pullers but for the sledges the going is not difficult for the snow supports them.

At 7.30 I saw an ice-hump formed in a lane which was at right angles to the direction of the wind which led to a hummock. The country consists of large uneven fields full of brown ice small ice-humps with snow-sludge and water-pools but not many large sea-leads. It is extremely tiring. F. has diarrhœa for the 2nd time and there does not seem much left of his morale. The sweet-water leads were often not so very "sweet" to cross. A black guillemot visible. A fine beautiful bear approached us but fled before we had a chance to shoot. This was a great grief for us and a pity too for soon we shall have no more bear's-meat left. S. and F. went after him but in vain. We were tired out and F. was ill. I gave him opium for the diarrhœa. Afterwards we had several hours' work getting S.'s gun in order. Its mechanism is dreadfully carelessly constructed. We have been awake and

Page 50 busy for 18 hours when at 8 p.m. we creep into the sleeping-sack. The course always S 40° W. The 10th at 6.10 a.m. all up.

Load on my sledge

1 small sack	3.5	[kgms.]	[7.7 lbs.
1 front basket	37.1		81.7
1 rear "	37.3		82.0
1 private sack	15.5		34.0
1 medicine chest	9.00		20.0
1 tent	9.0		20.0
2 tentp.	1.5		3.3
meat	5.0		11
	117.9		259.7
1 gun	1.6		3.5
	119.5		263.2
1 b. ammunition	6.5		14.3
	126.0	kilo	277.5
1 sext.	2.2		4.8
1 sack	6.0	photog.	13.2
	134.2		295.5]

Frænkel's sledge.

Boat	63.00	[138.6 lbs.
1 sack private	17.00	37.4
1 hose	3.5	7.7
3 pieces wood	2.0	4.4
1 ammunit.	3.5	7.7
1 univers.	3.0	6.6
2 field-glass	2.0	4.4
3 blankets	4.5	10.0
1 sleep. sack	9.0	20.0
	107.5	236.8]

	107.5	[236.8
1 sack books	3.0	6.6
2 oars	4.5	10.0
3 poles	2.0	4.4
1 gun	2.0	4.4
1 sack shoe-hay	1.0	2.2
	120	264

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	120	[264
cook. app. food etc.	12.0	26.4 lbs
8 boxes of matches	3.00	6.6
1 sextant		

1 aner.	0.5	1.1	4.6	10.1
1 psychr.	3.1	6.8		
1 change-sack	1	2.2		
spirit service etc.			8.00	17.6
2 cushions, gun-case & cleaning-box			1.7	3.7
1 drift-wood			2.0	4.4
1 tarpaulin			2.5	5.5
			153.8	338.4]

Long. 29° 5
Lat. 81° 56′ 5
ordinary gull visible. The ground extraordinarily difficult. Absolutely untrafficable sludge-pools encountered today. They consist of broad channels filled with small lumps of ice and snow. Neither sledge nor boat can be moved forward there. In consequence of the place-determination given above the course was altered to S 50° W. (to the Seven Islands). It is remarkable that we have travelled so far in latitude in spite of the wind having been right against us for several days. In consequence of our having come below 82° we have today had a feast with sardines for dinner and a Stauffer cake for *Page 52* supper. The going today has been good although the road is bad. We assume that we have gone 3 kilometers [1.8 mile] or possib. 2 minutes. Today I found for the first time small stones and leaves etc. on the ice. The character of the locality was as follows. Aug. 10 4 p.m. (No. 5) The ice hard, uneven, with hollows yellow and greyish, little covered by snow. The depth of the ice below the water close to the place: 1.05, 1.05, 1.35, 1.35, 1.35, 1.05 m. [41, 41, 52.6, 52.6, 52.6, 41. in.]. The find lay on a large floe in a hollow, 20 cm. [8 in.] deep and abt. 50 cm. [10 in.] in diameter. This find should make it possible to determine where this great amount of brown and hard ice which we constantly see has its place of origin. Up till now I have not found anything on the brown-yellow ice other than fine clay and now I find on the same ice a whole consignment of plants, sand, small stones, etc.

The ice was green-shimmering

Today there came a slight rain and then snow. We have gone into our tent after only 7 hours' march but it was so dreadfully fatiguing. Now S. is sitting mending trousers in "the seat" and F. is oiling guns. F.'s stomach pains are now over.

Aug. 11 was a regular Tycho Brahe day.[1] First thing in the morning I got into the water and so did my sledge so that nearly everything became wet through. S. ran into F.'s sledge and broke the boat with the grapnel. All the sledges turned somersaults repeatedly during the course of the day. Mine was twice turned completely upside down. The *Page 53* going was good but the country terrible. *All* imaginable difficulties happened and when the evening came we were not at all happy. Something else happened, however. F. shot an ivory gull. It was snow-white with black legs and feet. The legs had white stripes right across them and the feet (the webs) were chequered with white stripes. Three toes with web and a toe (short) behind. At the outer edge of the wings there were some small feathers with grey patches. The beak had a yellow point but was otherwise yellowish-white with black longitudinal shadings. The bird landed quite near us.

Thickness of ice 1.45 m. [4.8 ft.] I think I can assert with certainty that today I have seen a couple of blocks of glacier ice. One block contained 7 layers of dirt-stripes with white snow or ice between. The thickness of the block was 1.05 m [3.5 ft.] and the layers were nearly of even thickness and were parallel. A peculiar incident happened on crossing a lead. We stood quite at a loss what to do for the edges of the ice were wretched and the channel so shallow that the boat could not float. Our ordinary methods failed us altogether. Then while we were talking it over the ice-floe beneath Frænkel broke and so we obtained a bit of ice of *Page 54* considerable size and with the assistance of this piece we then made the crossing quite neatly. We have not been able to keep the course but have been obliged to go both to the north and to the east but endeavour to go S 50° W. Our distance today probably did not exceed 3.5 km. [2.1 miles]. Sample No. 7

At 4.30 p.m. our longitude was 30° E. At midday our latitude was 81° 54′ 7. F. thought he saw land and it was really so like land that we changed the course in that direction but it was found to be merely a peculiarly shaped large ice-hump.

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[1] Unlucky day.—*Trans.*

Sample No. 7 was found near the edge of a melt-hole and on the *under*-side of a thin, newly formed ice-covering about 2 cm. [.8 in.] thick lying over the water in the same melt-hole. On the under-side there were patches of about a centimeter [abt. .4 in.] in size.

Aug. 12. Sounding 320 m. [176 fathoms]. No bottom. Thickn. of ice 1.2 [4 ft.]. Sample 8 came up on the sounding-line when 200 m. [110 fathoms] had been sounded. At the close of the day's march we at last got better country after having had extremely difficult going for several days. Our distance today amounted probably to 2.5 minutes although the marching-time was shorter than usual.

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The course has been S 50° W and we are now so near Gillis Land that we might well expect to catch a glimpse of it. But neither that nor any other land is visible. Today we have eaten ivory gull without any other preparation than ordinary frying and found it tasted excellent. We tried to get at a seal as now we have not more than one meal of bear-meat left. My shoes begin to be so cut to pieces that I am afraid their fate will soon be sealed. Now it is raining on the tent when we go to bed at 3.30 a.m. Aug. 13. I make preparations for manufacturing a waterproof. The instant after we had gone to bed we again heard a whale but could not catch sight of it.

Sample no. 9

Aug. 13 at 5 p.m. start. Tried in vain to get a seal. The ice reasonably good. In a fissure found a little fish which was hardly frightened at all and seemed astonished to see us. I killed him with the shovel. It had a length of 7.5 cm. [3 in.]. Grey-green, dark prickly back, red-violet sides and white belly. Black pupil sourrounded by eyeball of 5.5 mm. [.2 in.] diam. Three dorsal fins, 1 caudal fin, 2 anal fins, 1 pair ventral fins beneath the head, 1 pair lateral fins behind the head. Just when we had passed the fissure S-g cried: "Three bears!" We were at once in motion and full of excited expectation. Warned by our previous disappointments we now went to work carefully. We concealed ourselves behind a hummock and waited, but no bears came.

The waiting became too long for old blood.

Then I chose myself as bait and crept forward along the level, whistling softly. The she-bear became attentive, came forward winding me but turned round again and lay down. At last it was too cold for me to lie still in the snow and I called out to the others that we should rush up to the bears. We did so. Then the she-bear came towards me but was met by a shot which missed. I sprang up however and shot again while the bears which were running away stopped for a moment. Then the she-bear was wounded at a distance of 80 paces but ran a little way whereupon I dropped her on the spot at 94 paces. My 4th shot dropped one cub. Then the third one ran but was wounded by Frænkel and dropped by Strindberg who had had a longer way to go and so could not come up as quickly as I. There was great joy in the caravan and we cut our bears in pieces with pleasure and *Page 57* loaded our sledges with not less than 42 kilogrammes [92.5 lbs.] fresh meat, enough for 23 days. Among our experiments as to the value of the parts of the bear it may be mentioned that we found the heart, brain, and kidneys very palatable. The tongue too is well worth taking. The meat on the ribs is excellent. In the evening I shot an ivory gull. The work of cutting up the bears, etc., gave us so much to do that we did not travel far this day. The wind has now swung round to SE so that we hope to drift westwards. Today the weather has been extremely beautiful and that is a good thing for otherwise the work would have been ticklish. When a bear is hit he gives a roar and tries to run away as quick as he can. We have been butchers the whole day. I have been trying the business of tanning in order to get skin to mend the sleeping-sack with. The skin of the fore-legs seems to be the most suitable being the lightest. With fairly clear air today we have not seen land in any direction. The 14th at 6.30 a.m. we went to our berths after having washed our hands and eaten ourselves chock full. The she-bear stiffened in a very little while, but the cubs were soft a long time. The she-bear had bitten her tongue right through. The ivory gull has three cries: 1. piyrrrr with four soft and trilling r's; 2. pyöt-pyöt; 3. resembling the croaking of the crow. The 15th at 12 o'cl. midd. we found our berths after having lain still on account of the rain and for repairs. I had manufactured a waterproof. The sleeping-sack mended, the knives sharpened. Coats mended. Spectacles ditto. One or two ivory gulls opium come to the remains of the bears. We have had rain for almost 24 hours and the wind from SE. Diarrhœa attacks S-g and Aée. Strindberg bandaged all over with cotton-wool and bindings for a cut in the hand and a boil on the upper lip. Washing with sublimate solution. Eating masses of meat.

The [?] at 4 a.m. start amid wind and snow. The skin-vest and "baschlik" taken out but were hardly needed. The country very bad but the going good. We crossed bear-tracks. I think that practically all the ice is pressure-ice. Even on level floes we see parallel lines which point to the floe containing pieces standing on edge. I have seen the same thing today in various places in the old yellow floes. All the hilly country consists undoubtedly of old hummocks and here most of the country is hilly. Our long. today 31° E and probably latitude *Page 59* 81° 50. We shall therefore change our course tomorrow to S 60° W. Pretty clear now for a while but no land visible. August 17, 10.40 a.m. a Ross's gull and two black guillemots or little auks. Our journey today has been terrible. We have not advanced 1000 meters [1100 yds.] but with the greatest difficulty have dodged on from floe to floe. The ice here is fearfully pressed together and shattered into small floes. A fairly reliable latitude determination gave 81° 47′. Bear-heart (fried) tastes a little bitter. Bear-meat in Stauffer's soup tasted very good. The ration of bear-meat per meal is from tomorrow morning to be increased to 1.1 kilo [2.4 lbs.] per person.

Aug. 18 at 1.40 p.m. start. During the night the ice had altered very much. The wind had turned more northerly. The weather beautiful. The going extremely troublesome, we ferried 5 times before midday, *i.e.,* in 4 3/4 hours and had to begin again as soon as we had eaten. The ice is much divided into small floes. Many seals in the large open waters between the floes. A black guillemot visible. The sight of F's gun had dropped off but was found again. We must be near the sea, the ice being so divided. The horizon almost perfectly clear towards Gillis Land but we did not see any land in that direction. I believe that unpressed ice is found only near the egress of the Polar stream into the open sea [and is] formed by the freezing of the sludgy water. In the afternoon we had 3 ferryings and 1 rafting. With all this work we have hardly come 1 kilometer [1100 yds.] on our *Page 60* course, I suppose. Thick. of ice 1.2 and 1.7 m [3.9 and 5.6 ft.]. A little auk visible. While we were sitting inside the tent and S. & F. were getting the supper ready and I was mending my pants I heard a noise outside the tent and when I looked through the crack in the opening I saw a bear close to my nose. I did not leave off sewing but merely said: "Look, there's another bear for us," whereupon F. took hold of one of the guns (which by chance had been taken into the tent for cleaning) and crept out. The bear then stood a few steps from him and . . . in order to attack but was met by a ball that brought him down dead after he had gone a few paces. We continued our work and our supper before we even looked at the carcass. But afterwards when we inspected the animal we found it was a large he-bear, undoubtedly the finest of all we had shot. We took out the brain, kidneys, tongue, and some pieces along the back, altogether abt. 10 kilo [22 lbs.] in order to supplement our supply of fresh meat. Strindberg took the lunar distance to check the chronometers and determined our position. He also set out some tackle for night fishing baited with meat (bear). The wind is now easterly and we are happy. Now too the horizon towards Gillis Land has been fairly clear but we have not seen anything of it. The difficulties in ferrying and rafting are constantly increased by the formation of new ice and the lively movements of the floes, which during the last twenty-four hours has been greater than we have noticed on any other occasion.

Page 61 The 19th at 8 p.m. Start. Attempt at frying with bear-fat and F. said: "What a treat if we can make sandwiches." Of the bear we took only the brain, kidneys, and the best pieces, altogether abt. 8 kilo [17.5 lbs]. We have done a good day's work probably 5 kilom. [3 miles]. Leads large but regular and with large [strips] between. The terrain exceedingly tiring, the new snow preventing us from seeing the irregularities which constantly give the sledges unexpected jerks. The fresh-water pools, not yet frozen, force us to detour a lot. I am quite worn out by the day's work. The reconnoitrings are carried out by me and are very troublesome. I often have to go a long way among hummocks and over pools and along the leads. The worst are the fresh-water pools which turn in innumerable windings, real labyrinths, and which are united by means of wide fissures that do not become visible before one is close to them. I almost always throw my gun over my shoulder when I go off reconnoitring. S and F sit waiting and shivering. Sometimes they reconnoitre in the one direction and I in the other. The reconnoitring for a route in the uneven country is almost as trying.

We have encountered an immense lead running N 20° E. Exciting crossings must often be made. The sledges capsize or remain hanging over an abyss while the puller tumbles down. Then comes the order "lie still" and there he lies a *Page 62* long while holding up the sledge until the others can come to his help. The sledges must often be pulled at a great speed at one part of the crossing and slowly during another part. They must often be swung round on a point or in the middle of a pass. The axe and the spade must often be used to make a road. Tracks for one or both of the runners must be hewn. Perhaps the sledges have to be unloaded entirely or else they are balanced across the boat. A line at each end of the boat makes it possible to pull it forwards or backwards. The quays break just when the weight of the sledge rests on them. The sledge with its valuable cargo is in a position of the greatest danger.

Aug. 21, 12.10 a.m. start. Red-breast. Magnificent day. Air light. Faint north wind but the half frozen leads and pools of water have caused us an immense loss of time. A single ferrying took 2 hours. I believe that we have not hitherto had such a large tract of ice so hummocky and so broken. Sample No. 10 Sample No. 10 was attached frozen fast and half dry (grey) to the fractured surface of a piece of ice pressed up by a lead. This evening on my proposal we tasted what raw meat was like. Raw bear with salt tastes like oysters and we hardly wanted to fry it. Raw brain is also very good and the bear's-meat was easily eaten raw. Just as we were pitching our *Page 63* tent three bears came to attack us. We took up a position near a hummock. S-g shot the old one with one bullet.

F. shot the other with two. I fired four shots at the other cub and made hits with all but his wounds were not so serious but that he could manage to get away among the fissures and pools. We took the best bits, i.e., 2/3 of the tongue, the kidneys and the brains. We also took the blood and F. was instructed to make blood-pancake (my suggestion). He did this by using oatmeal and frying in butter after which it was eaten with butter and found to be quite excellent. Of the bear-cubs one was rather big, the other (a female) was smaller. All the cubs we have seen have been young ones from the previous year. Experiment with alga-soup and Mellin's food-cake (water with yeast-powder) gave exc. result. The alga-soup (green) was proposed by S. and should be considered as a fairly important discovery for travellers in these tracts. Aug. 22, 5 a.m. Start. Young ivory gull, weight 475 gr [1 lb.] (full grown) was shot by me. It had black tips to the big tail and wing feathers as well as to the short covert-feathers. On the upper side and the sides of the neck there were some feathers with grey tips. The head was grey-black around the root of the beak, the eyes, *Page 64* and the front part of the head, the beak black. It seems to be the young ones that give the cry "pyöt-pyöt" noted under Aug. 14 as that of the ivory gull. When the mother is anxious or gives a warning she makes the cry piyrrrr (see Aug. 14) but then with sharp *r* and in close succession. The young bird was white underneath. But the feet were marked as stated for the older [birds]. The terrain today has been terrible and I repeat what I wrote yesterday that we have not previously had such a large tract with ice so hummocky. Scarcely two square metres of ice can be found which does not present evident traces of pressure, the entire country consisting of a boundless field of large and small hummocks. One cannot speak of any regularity among them. The leads today have been broken to pieces and the floes small, but in general it has been easy to get across. Now they are so frozen that neither ferrying nor rafting can be employed. Today a lead changed just when we had crossed it (5 minutes later and it would have been impossible) and we had an opportunity of seeing a very powerful pressing. The floes came at a great speed and there was a creaking round

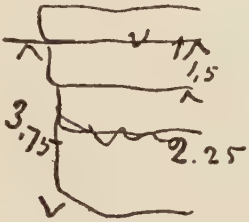
about us. It made a strange and magnificent impression. The
day has been extremely beautiful. Perhaps the most beautiful
we have had. With a specially clear horizon we have again
tried to catch sight of Gillis Land but it is impossible to get
Page 65 a glimpse of any part of it. Our course has been S 60° W
as on the previous days and the day's march has probably
brought us about 3 min. in the direction of our course. The
clear air was utilized by S-g to take lunar distances. He saw
haloes on the snow: an inner one more sharply defined with
the inner boundary red and Λ distance to the sun (the
halo-radius from the inner boundary) 21° 45′; . . . outer
halo (47°) where the colours however could not be determined quite absolutely. Observed from the ground these
haloes seemed to be the extremities of parabolas or of
ellipses. Magnificent Venetian landscape with canals between
lofty hummock edges on both sides, water-square with ice-fountain and stairs down to the canals. Divine. Bear-ham
several days old exquisite. I massaged F's foot. He had been
pulling so that his knee went out of joint but it slipped in
again and there was no harm done. S-g had a pain in one
toe, cause still unknown.

Page 66 Aug. 23, 11.30 a.m. Start. The difficult ice-district continued
until 4 p.m. when we found smoother ice. A lead opened
just when we were about across and we had once more to
employ ferrying. Two bear-tracks were crossed. F considers
that the fresh-water pools often or sometimes penetrate the
entire thickness of the ice. S-g called our attention to the
fact that the lateral fissures are sometimes connected with
fresh-water pools in such a way that we may suppose that
the fresh water of the pools weakens the ice to breaking-point when the pressing occurs. Alga-soup was made with
large portion of algæ to which was added fried bear-meat
and a couple of spoons of Mellin's food and water which
then became a soup which I thought was excellent but F
and S liked it less although they considered it could be used
as emergency-soup. The ice of the fresh-water pools now
begins to bear here and there and that is a good thing for
one can despair at the roundabout way one is obliged to go
on their account. Our day's march ought to have been abt.
Page 67 6–7 kilometers [3.6–4.2 miles] and we are terribly tired. At

1 p.m. I found a floe with masses of clay. It was examined carefully and samples 12, 13, 14 were taken. The two former contained clay and organic plant-traces which were found in it. The last (14) contains only clay. Such plant-parts (the threads) I have certainly seen in the clays before but have not paid attention. Sample No. 11 consists of driftwood which F found sunk down into the snow. It was rotten but I took a part of it. The bread rations are now diminished to 75 gr. [2½ oz.] hard bread and 150 gr. [5 oz.] biscuits, but the meat rations are increased to 2.8 kilo–3 kilo [6.2–6.6 lbs.] per day for all three together and we thrive very well on the diet. Today I shot a seal in the head but without succeeding in getting it. Sample No. 15 contains soup-algæ and Sample No. 16 contains the eyes of the young ivory gull that was shot, to permit us to examine their construction against snow-blindness. It is not easy to preserve all these samples from damp and accidents.

Sample
No. 16
Page 68

Thickn. of ice 3.75 and 1.5 [12.35–4.95 ft].



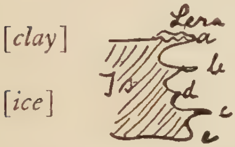
Aug. 24 at 3.40 p.m. Start. Ice-conditions still dreadful. We are now in a difficult hummocky district miles in breadth.

I caught a hasty glimpse of a fish. It was abt. 1 d.m. [4 in.] long, dark-grey on the back and marked with a couple of small wide transverse stripes (far apart) across the back. Like the other one, it was found in a lead connected with a salt-water pool and it was immediately below W. S. (abt. 2 d.m.) [8 in.]. It moved slowly like the other one but glided in beneath the bits of ice.

On the surface of a very large white pressed piece of ice there was made find No. 17 all the parts of which lay near each other. The lighter parts more on the surface. The heavier deeper. After this find I observed that the ice is perforated everywhere and filled with things that are certainly well deserving of a special Polar-expedition on their own account. But then one should be provided with appliances to enable one easily to enlarge the holes and take up the objects. The naturalist would find the interior of the ice to be almost as rich in contents as the earth-crust or the *Page 69* sea. Find No. 17 was washed in a tea-strainer, whereby, perhaps, some small quantity (clay ?) was sluiced away but otherwise everything was included. The leaves were placed No. 17 in layers in a "bandage" and dried against the breast. In the neighbourhood of the find there were discovered (as everywhere amidst the ice) the usual yellow clay-coloured ice surfaces. Find No. 18 consists of divers little things which were picked up at some other place on and within the ice over a surface of 2 m^2. They do not seem to have anything to do with each other, however, but merely confirm the above remark as to the riches of the ice. We have several times seen a black little bird with white on the wings like a black guillemot, but white under the belly like an auk. It has a kind of twitter and we have not seen it fly but only dive. What kind of bird is it? Fulmars and ivory gulls sail around us pretty often. We now fry the bear's meat without No. 18 butter and find it excellent. The butter is eaten now only at dinner. The meat ration pr. day at present is 1.3 kilo [2.9 lbs.]—breakfast—all three of us and 0.4 [.9 lb.] apiece for dinner. The bread ration is 75 gr. [2.5 oz.] of hard bread pr. day and person and 150 gr. [5 oz.] of biscuits pr. day and person. Last night F had severe diarrhœa but this prob. was the result of catching cold. He suffers sometimes from *Page 70* cramp perhaps on account of over-exertion. S-g's tender foot has been cured by rubbing boot-grease on the stocking. Cramp relieved immediately by massage-treatment. Today bear-tracks were seen and the day before yesterday two such traces were observed. This means for us that we have wandering butcher's shops around us.

Aug. 25 at 9.45 p.m. Start. The ice today has been much better. Many leads but they have been easily crossed and between them the floes have been large and fairly level. A sample No. 19 of peat-moss was found in a hole in the ice. A big find was made at the tent-place in the evening. There the clay contained leaves, bits of driftwood, shells (sample No. 20). A bird was seen, most likely a skua. He was quite black with the exception of underneath where he was blackish-brown. Flew as silently as a spirit and dived down here and there for food. I shot one of those mystical auks. He looked like an ordinary auk but was white all the way up the side in front of the wing so that at a distance he looked like a black guillemot and in addition the tips of the feathers were white on the inner half of the wing. Three-toed without spur, the beak quite black.

The sea-serpent was seen but looked different. He still appeared to have two buckles but now he seemed to be grey *Page 71* all over, and, when he dived, a cloven fin was seen at the end. Today I have at last observed how the ice arises that displays stratified layers of clay. It is as follows: the clay drips down from an overlying edge (a) to the one lying below (b, c) and remains on the edges of these and freezes fast after which the intermediate space is filled with ice and snow. The layers, consequently, do not traverse the entire piece (should however be investigated). The edges d and e, which are not sufficiently prominent, do not obtain any part of the layer of clay, and therefore no layer is formed on them.*[1] F fell into the water today and has diarrhœa and S has a pain in his foot and I have diarrhœa but we covered a good distance today in any case. This evening I have made fish-hooks of pins and have fished with meat and fat. We shall see if I get anything tonight. The going has been excellent. Thickn. of ice 1.1 and 1.1 [3.6–3.6 ft.] on level floe (not by hummock).



N.B. that the tops and edges especially blacken and retain clay on melting. I have seen layers of clay 2–3 cm [1 in.] thick there.

Thickn. of ice 1.3 m [4.3 ft.] level floe.

The 27th at 2.30 a.m. Start. The bait (meat and blubber) on all the 6 hooks was untouched. They were at a vertical distance of 0.5 m [19 in.] from each other and were sent abt. 5 m [16.5 ft.] below the surface. Thickn. of ice 1.44 [4.75 ft.] and 1.25 [4.125 ft.] on level ice. Thickn. of ice with *Page 72* hummocks 2.65 m [8.75 ft.]. During the whole of a.m. we had good going and good floes although the leads were numerous. But in the evening the difficult country began again. It consisted of small and, in part, antheap-like hillocks standing very close together between which the sledges repeatedly capsized and caught fast. However we certainly made 6–7 kilom. [3.6–4.2 miles] today and had one of our best days. The weather has been magnificent. I repaired S's photographic app. and the spirit tin and had much trouble with sample No. 17 which is ready at last. At the edge of the water one can see how stratified ice arises. The phenomenon of stratified sea-ice is an illusion. The stratification arises from the periodic melting and freezing of the water at the edges of ice which already exists. Today I have seen in fresh-water pools isolated dark patches showing that salt water, locally and without cracks being necessary, can come into communication with the bottom of fresh-water pools. But which water it is that opens communications is, on the other hand, not known with certainty yet. Today we have seen ivory gulls and 1 bird which probably was a little auk. *Page 73* This evening too I have put out the long line for fishing. F has again had very bad diarrhœa and has been given opium. I have had diarrhœa too today but I imagine I am well again now without any medicine. S is greatly occupied calculating lunar distances. Today we have not eaten more vegetable substances than 4 pieces of Schumacher bread and 6 Albert biscuits per man for we have begun to use Mellin's food powder in the coffee and chocolate.

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[1] For this * there is no note in the diary.—*Ed.*

On stock-taking Aug. 25 2 a.m. we possessed:

Andrée's sledge.

rear basket

2 full Snowflake
1 Snowflake for 2 days
2 Mellin's food-biscuits
1 Albert biscuits
1 Congo "

front basket

1 tin coffee
4 " choc. meat-powder
4 " butter
3 " sardines
3 " lacto ser. cac.

1 bottle wine
1 “ syrup
1 big tin salt
1 little “ “
3 tins butter
2 “ soup tablets
1 “ paste
1 “ meat (5 kilo) [11 lbs.]
1 “ oatmeal
1 sack meat (5 kilo) [11 lbs.]
Ball cartridges
5 “ condens. milk
1½ kilo [3.3 lbs.] cheese
1 tin paste
Shot cartridges

Page 74 *In the boat there is:*

5/7 tin butter
1/3 “ coffee
1/2 “ Albert biscuits
1/2 “ milk
1½ “ lactoserin
0.6 “ meat-powder chocolate
1/2 “ Schumacher bread

Strindb. sledge.

Whortleberry	1	1 tin		Sugar		4 “ [9 lbs.]
Congo	1	1				
Hardtack	4 + 2	6		Syrup		1 bot.
Snowflake	1 + 2	3		Stauffer	1 t.	1
Cloetta coc.	1 + 2	3	biscuit	Albert	1	1
Small coffee	2	2		Cracknel	1	1
Sardines	1 + 4	5		Oskar	1	1
Butter	3 + 3	6		Mellin flour	3	3
Limejuice and chocolate				Pemmican		3 kilo [6.6 lbs.]
Meat		5 kilo [11 lbs.]		Lactoserin	4 t.	4
				Milk	2	2
				Paste	1	1

Of this there was used:

coffee for 32 times à 50 gr. [1.7 oz.]

Lactoserin	33 times à 64 gr. [2.2 oz.]
Stauffer	13
Soup	6
Sea algæ	6
	90

Page 75 The 28th 9 a.m. Start. The ice good but pressed and several leads, of which one rather troublesome. We had to ferry (long line laid out last night but without result). Last night and today the ice has been very much in movement. The fresh-water pools are now in general so frozen that we can pass direct over the smaller ones. At midday we come into some terrible ice: large hummocks with deep perpendicular pools between. This evening the ice has been typical Polar floe-ice, scarcely a square metre that is not hummocky and the entire surface is covered by old low hummocks and pieces of ice which by melting, filling up with snow, and freezing and the "grinding" of the snow have been rounded off into innumerable small hillocks varying very much in form and size and between which there are frozen pools of water with ice which is still level but which by its bulging etc. shows that it too will soon join the billowy part of the surface. The study of the appearance of the ice, the fissures, the hummocks, the slips, the pressures etc. leads the thoughts irresistibly to the geological phenomena in the crust of the earth (whose late sedimentary strata correspond to the pools of water). Today it has been cold with a wind-velocity of 7 metres [23.1 ft.] but we have not suffered from it. Then tent
Page 76 and sleeping-sack begin to be difficult to manage. F. is bad again. Yesterday he had an opium tablet against diarrhœa and this evening he has had a morphine tablet against the pains in his stomach. We shall see if he can be made a sound man again. We now eat only 4 Schumacher squares and 6 little biscuits per day but we add Mellin's food-powder to the coffee and lactoserin and find this excellent. Our course is still S 60° W. The wind has been NW today so we hope we have drifted towards the south. Seals, fulmars, and ivory gulls are still seen. The two last mentioned came so near that one was tempted to try to kill them with a stick. Thickn. of ice 1.2,

1.2, 1.15 m [3.96, 3.96, 3.85 ft.] (Kullb. 5567 Aug. 20, 0 astr. midd. 20 Aug. corr. G.M.T. = —45 m 21 s.
Slow if amounting to 9.7s daily)
Lat. 81° 47′
Long. 28.4° E

Start the 29th 3.30 p.m. The ice as before but the leads are still very extensive and broken so that they are very difficult *Page 77* to cross. It now begins to feel cold. We have seen a bear today but unfortunately he went off at a gallop when he saw that he was noticed. S's sledge badly broken and we could only just manage to mend it. We come slowly onwards and I imagine we shall have to make a late autumn journey to reach Mossel Bay. The ice and the snow on it are becoming as hard as glass and it is difficult to pull the sledges across it. Today we have tried to go S 45° W as S's lunar observations showed that we were rather more to the westward than we had imagined. But to keep a tolerably steady course among the leads is, upon my word, no easy task. Tonight was the first time I have thought of all the lovely things at home. S. and F. on the contrary have often talked about it. The tent is now always covered with ice inside and the bottom, which is double, feels pretty hard when it has been rolled up. I sweep it clean morning and evening before and after the cooking.

The 30th 5 p.m. Start. The ice as before and the course too but this was hard to keep for the leads have been difficult to get across. Two red-breasts visible. At last we found ourselves on a floe from which we could not advance without rafting. As we had not more than 20 min. left of our marching time we determined to pitch our tent and see if the ice *Page 78* might not move during the night. Scarcely had we erected the tent before S. cried out: "A bear right on top of us!" A bear was standing 10 paces from him. I was lying inside the tent sweeping the floor and so could do nothing but F. who was outside caught hold of a gun and gave the bear a shot that made him turn, badly wounded. To save cartridges he was allowed to run a bit but at last he had to be finished off with 3 more shots. The bear, however, had managed to get down into a broad lead and rolled himself about there but he could not swim far. I threw a grapnel past him and brought him in to the edge of the ice. This however was so thin that we hardly dared to stand on it but at last I succeeded in putting a noose around his neck and one around a foreleg. S. pried with the boat-hook and so we hauled him up onto the ice pretty easily. The scene was photographed and the bear was cut up. Once more we have now 30 kilo [66 lbs.] of meat, *Page 79* i.e., meat for 14 days if we calculate 0.9 kilo [2 lbs.] each morning and evening and 300 [gr. = 11 oz.] for dinner. These quantities are carried next to the body so as not to be frozen. Two red-breasts visible. The 31st at 9.30 p.m. Start. The sun touched the horizon at midnight. The landscape on fire. The snow a sea of flame. The country fairly good. For the first time we had broad new ice to cross. First I crept across on all fours to test if it would hold. Then we went across in several places. One ferrying had to be made. The leads were passable but the ice was in lively movement. It is stirring to work the sledges onward in the midst of the crashing ice all about us. Sometimes a lead closes just when we need it, sometimes it opens suddenly the moment before or after a crossing. I had diarrhœa badly perhaps in consequence of a chill. F.'s sledge badly broken and had to be repaired on the spot. In the evening I took both morphine and opium. Thickn. of ice 0.9 and 1.10 [3–3.6 ft.]. When we wakened on Sept. 1 we felt we wanted rest and repairs. *Page 80* The sleeping sack had to be mended and we needed to be out of harness for a day. Everyone sewed and we chatted, ate, and drank. We were in the best of humours especially when S. announced that we were at 81° 16′ n. L. and that hence we must have been driven rapidly southwards by the prevailing strong NW wind. We even had sandwiches and coffee with our bear's-meat dish at dinner. In the evening we took soundings but the sounding-line stood so obliquely (sin Λ with horiz. $= \frac{1}{4.3} \therefore \Lambda = 14.5°$) that of our 320 m [1050 ft.] of line no more than 70 m [220 ft.] were of use. Its direction was to S 80° E at the lower end. S. has calculated that it is probable that there exists an eastward flowing current with a speed of abt. 1.4 m [4.6 ft.] per sec. Thickn. of ice 0.70–0.95–1.35 m [2.3–3.1–4.45 ft.] along the edge of the same floe which is fairly level although with ice-humps here and there.

We shall now try to keep day and night schedules. We have found that the last bear's-meat which had not been allowed to get wet in any way except for our pulling the bear through the water was juicier than usual and so we shall in the future treat all the bear's-meat in that way. Now in the evening
Page 81 Sept. 2 the wind has swung round to S 60° W but fortunately is not very strong. I have now begun to use wool-and-hair stockings at night and tonight for the first time I shall crawl into the sleeping-sack top.

Sept. 3 11.15 o'cl. Start. Thickn. of ice 0.90 & 0.95 [3–3.3 ft.]. I had to go out during the night on account of diarrhœa and I then found a bear standing a little way off staring with open mouth at the camp. He seemed however to have found the matter suspicious for he jogged away and so cheated us both of brains and kidneys to say nothing of kidney fat and blood-pancake.

Thickn. of ice 1.50, 0.95 [4.95–3.3 ft.] Today we found ourselves surrounded by broad water-channels of great extent and were obliged to trust ourselves entirely to the boat. We succeeded in loading everything upon it and then rowed for 3 hours at a pretty good pace towards the Seven Islands (our goal). It was with a rather solemn feeling when at 1.50 p.m. we began this new way of travelling, gliding slowly over the mirror-like surface of the water between large ice-floes loaded with giant hummocks. Only the shriek of ivory gulls and the splashing of the seals when they dived and the sharp commands of the steersman broke the silence. We knew that we were moving onwards more quickly than usual and at every turn of the leads we asked ourselves in silence if we might not be able to journey on in this marvellous way to the end. We called it marvellous for the everlasting pulling of the sledges had become tiring, I fancy, the last few days
Page 82 and it would be a great relief for us to travel awhile in another fashion. But at 5 o'cl. our joy came to an end; we then entered a bay in the ice which immediately afterwards was closed by a floe so that we could go neither forward nor backward. We were satisfied however, for things had gone well, the boat was excellent, and there was room for all our luggage. Frænkel shot a bird which *probably* was a young black guillemot. It had a weight of 400 gr [1.3 lbs.]. Long

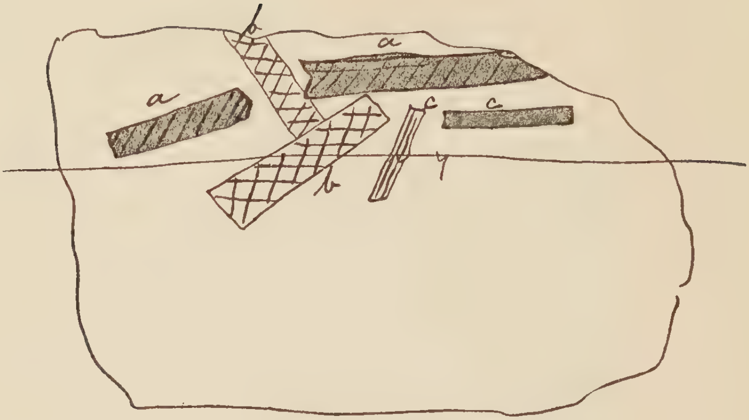
black beak with curved upper beak. The head long. The under side finely grey-shaded the whole way from the bill to the tail, most of the neck, least in the middle round the belly. The back black but with mixture of white, most at the head and tail, least in the middle. The wings with black edges around except one little white edge on the back inner part of the wing. The middle field of the wing white with black transverse ends. The tail feathers very short and black with a little white on the covering feathers. The feet red-brown. Three toes and web.

Sept. 4 Strindb. birthday. Festal day. I awakened him giving him letters from his sweetheart and relations. It was a real pleasure to see how glad he was. Today we have had some extra food in honour of the occasion. The breakfast consists of bear's-meat with bread and Stauffer's pea-soup with bear's-meat and bear's fat. Dinner fried bear's-meat kept warm inside our waistcoats. Supper bear's-meat, bread and pâté de foie gras, Stauffer cake with syrup sauce, syrup and water, speech for Nils, lactoserin chocolate.

Place-determination today has given 81° 11′ L and 29.6° E.L. S celebrated his birthday by falling very thoroughly, sledge and all, into the soup. We had to pitch our tent after 3 hours' march and then had a very troublesome and time-wasting business to dry him and his things. Much of the bread and *Page 83* biscuits and all the sugar damaged, but we had to keep it in any case and this was done by drying a part of the bread slowly and using it as before. The remainder was fried along with the bear's-meat and the sauce. The sugar is poured into the chocolate and coffee in its liquid form. The biscuit-mud is mixed with cold water and then boiled together with the chocolate. It was a pretty grave misfortune but the worst of it is that it makes life more uncomfortable for us. Last night I lay in a single blanket instead of a double one but found it rather cool. Yesterday the ice was rather level and fairly free from large hummocks but it was fresher ice everywhere and covered with fresh snow which made the sledge-going very heavy. Thickn. of ice 1.65m [5.5 ft.]. The accident to S's sledge did not lessen our festal mood but we were jolly and friendly as usual. The altazimuth became wet through with salt water but was washed out with fresh water and dried and did not seem to have suffered any damage. S's chronometer also seems to have escaped. Ivory gulls swarm around us and keep up an awful row. We experimented with the Berossin chocolate yesterday and it was found to make a very good chocolate if 75 gr. [2.5 oz.] is boiled together with 10 cups water and 160 gr. [5.6 oz.] of the biscuit soup (Congo biscuit). The leads yesterday were pushed together, an effect that the S W winds always seem to bring *Page 84* about. On such a journey as this one develops a sense both of the great and of the little. The great nature and the little food and other details.

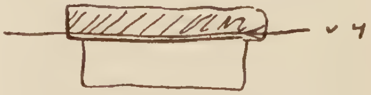
Sept. 5 6.45 p.m. Start. Dreadfully heavy going but the ice fairly supportable.

The leads pushed together by the south-west wind. Animal life seems to be becoming richer. A bear had been close to us during the night. Twelve ivory gulls sat beside the tent on a piece of ice. F. shot three of them with a single shot. A little auk and two black guillemots visible. Half a dozen seals in the same soup, etc. After 4 hours' extremely fatiguing march we came to a broad channel which we could not pass and so I determined to launch the boat and try to move on by rowing. This was a fortunate determination for we came more and more upon broken ice and we kept on rowing until 6.45 a.m. the 6th, in a direction varying between S 60° W and S 30° W. It was very refreshing to be able to use this mode of travelling. The intervals between the floes were several kilometres wide and only in part covered with ice-sludge which was a good thing for ice-sludge is a very tough mixture to *Page 85* row along in. We had no wind to struggle against and rowed on without the slightest pause until at the time mentioned we went ashore on an ice-floe to pitch our tent. Respecting the ice of the a.m. it is to be remarked that I measured one floe with as much as 5.9 m [19.67 ft.] below the water (abt. 0.5 [19 in.] above the water) and that in the fracture of this block one could see that, although it was homogeneous apparently, in reality it was composed of pressed thin floes that had frozen together.



a a = yellow sheets b b = blue sheets
c c = almost white sheets etc.

All thereupon frozen together into one block which judging by the exterior was perfectly homogeneous. Another thing *Page 86* which had already struck us on the previous march was that on the edges of the floes there were found thrown up a number of small bits of ice which lay spread about and evidently had not come there by pressure. In some places fairly large block-bits had been flung far forwards on the floe. I said that only waves could have caused such a distribution of the ice on the floe and that the ice we were on must have been handled by the waves (the small pieces did seem to have been eaten away). This opinion was confirmed by the fact that the very next day we had found so much open water. The ice-floe on which we now put up our tent after the boat journey has given the following measures. 1.0–2.0–1.4–0.95 m. [6.4–6.6–4.6–3.10 ft.]. Roundabout it is edged by a projecting border which



extended 5 cm [2 in.] deep below the W. S. [surface of water]. The ice below it was greatly eaten away. The length of the floe was abt. 100 m [330 ft.] and the breadth abt. 75 m [248 ft.].

When we awakened after a long and fortifying sleep the openings around us had frozen together and we had terrible work to move 50 m [165 ft.] to the next floe. (The air was
Page 87 clear and almost 6° cold [21° F.]. After we had reached it and reconnoitred we found that we possibly might advance in another direction and so we turned back and met a walrus whose noise and behaviour in other ways and whose habitat showed us that we had met "the sea-serpent." Consequently they were walruses we had heard and seen all the way up at the place where we landed from the balloon. After a short row we came into much thicker snow-sludge which at last became almost metre-thick and in which the boat absolutely could not be forced forward. The situation became critical but one of us succeeded in jumping "ashore" and pulling the boat to a point where we could stop and pitch out tent. This sludge is something fearful. It occurs when cakes of thin newly-formed ice are pushed on top of each other layer after layer like tiles or like cards in a pack. The mass thus formed in the water becomes "sludge." That which is assembled near the edges of the floe gradually becomes solid ice by freezing together and being mixed with water and snow. Before it freezes together it constitutes an extremely treacherous edge which one easily sinks through.

The next day we tried again and then after abt. 5 hours' work we advanced abt. 1 kilom. [1100 yds.] on our course but then we had to wait again. Meanwhile we busied our-
Page 88 selves making a sail out of the bottom tarpaulin of the boat, a rudder of the shovel and the table. Our meat supply is beginning to come to an end and we shot two ivory gulls to supplement it. We do not like to shoot unless we can get at least two gulls per shot. They are delicate birds but I think they cost a lot of ammunition. For the last few days F. has had a pain in his left foot. I give him massage morning and evening and rub on liniment. Today (p.m. the 9th) I opened a large pus-blister, washed it with sublimate solution and put on a bandage. Now I hope it will heal for it is hard for us to be without F's full strength. This is more than needed with our trying work. Our attacks of diarrhœa seem to have stopped. Yesterday I had a movement for the first time for at least 4 days, but in spite of that did not notice any diarrhœa.

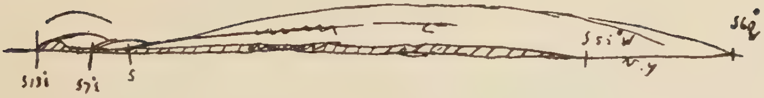
The amount of the excretion was moderate and of normal consistence. F. has frequent movements and the consistence seems to be rather fluid but he does not complain of pains in the stomach and of diarrhœa as he has done almost constantly before. On Sept. 6 at midday our lat. was 81° 4.9′ and
Page 89 today, the 9th p.m. our long. is approximately . . . . . But we are probably more to the north than before for we have had several days' wind from directions lying in the neighbourhood of S E. Just now I had to leave off writing in order to fire a shot and drop two ivory gulls. Such birds always gather around our camp. Oh, if we could shoot a seal or a bear just now. We need it so much. Thickn. of ice 1.1–1.5–1.55 [3.6–4.95–5.1]. I just shot two more gulls in one shot. Sept. 9 6 p.m. Start. F's foot is now so bad that he cannot pull his sledge but can only help by pushing. S. and I take turns to go back and bring up F's sledge. This taxes our strength. We could not manage more than 6 hours' march especially as the country was extremely difficult. Just when we stopped I happened to fall into the water, for an ice-floe which to all appearance, and on being tested with the boathook, seemed to be solid and on which I jumped, proved to consist of nothing but a hard mass of ice-sludge which went to pieces when I landed on it. I flung myself on my back and floated there until the others reached me a couple of oars with the help of which I crawled up again. Hitherto I had no idea that ice-sludge could take on so many varying forms. It most frequently consists of thin cakes pushed up on top of
Page 90 each other and these naturally possess a certain ability to float and to cohere, but little carrying-power.

The upper ice-edge on the drawing made on the 4th page before this has evidently arisen by the pushing of ice-sludge on to the edge of the floe, and on examining the floe on which we had our tent last night I found its vertical sides all the way down to the lower edge, so to say, coated with plates of ice-sludge (the thicknesses of the floe are 1.4–0.8–1.15 m [4.6–2.6–3.8 ft.]) and we often see solid pieces of ice in which there can be observed the sheets that originally formed its core. *The thin* ice consequently constitutes a greater factor in the formation of the large ice than has hitherto been supposed. Is it not possible that something similar occurs in geology? Our thoughts are led inevitably to some stratified rocks, e.g., gneiss. Large seals are swimming about in the water here but we cannot shoot well enough to be able to kill them on the spot and if this is not done they sink.

Sept. 17. Since I last wrote in my diary much has changed in truth. We laboured onwards with the sledges in the ordinary way but found at last that the new-fallen snow's . . . and character did not allow us to make fast enough progress. F's foot which still did not allow him to pull compelled me *Page 91* and S to go back in turns and pull F's sledge too. One of S's feet was also a little out of order. Our meat was almost at an end and the crossings between the floes became more and more difficult on account of the ice-sludge. But above all we found that the current and the wind irresistibly carried us down into the jaws between North-East Land and Franz Joseph Land and that we had not the least [chance] to reach North-East Land. It was during Sept. 12 and 13, when we were obliged to lie still on account of violent N W wind, that we at last discovered the necessity of submitting to the inevitable, i.e., wintering on the ice. Our position is not specially good our supplies of provision consisting of (Sept. 13)

Page 92 Rations [?]

Our first resolution was to work our way across to a neighbouring ice-floe which was bigger and stronger and richer in hummocks than that on which we were which was low and small and full of salt-water pools, showing that it was composed of small pieces which would probably easily separate in the spring. We reached the new floe by rafting with the boat and soon found a suitable building-plot consisting of a large piece of ice which we hollowed out to some extent. The sides and the parts that were missing we supplied by filling up with blocks of ice and snow over which we threw water to make them solid and durable. On the 15th we at last succeeded in getting a seal, as I had the luck to put a bullet right through its head so that it was killed on the spot and could easily be brought "ashore." Thanks to this we have tolerably large rations for the next three weeks. We ate all the seal except the skin and the bones. I do not except the stomach and the contents of the stomach and the *Page 93* intestines and the liver. But the contents of the stomach consisted of hardly anything else than empty (crustacean) shells of the same animal that had stopped up the hydrogen-gas apparatus. Every part of the seal tastes very nice (fried). We are especially fond of the meat and the blubber. If we can only shoot a score of seals so that we can save ourselves. The bears seem to have disappeared and of other game we can see only ivory gulls, which, it is true, are not to to despised, but which cost too much ammunition. The gulls come and sit on the roof of the tent. Remarkably enough the fulmars seem to have disappeared and of other birds only a little auk or possibly a young black guillemot have been visible during the last few days. F's foot is better now but will hardly be well before a couple of weeks. S's feet are also bad. I have rigged up a landing-net to catch plankton or anything else that can be found in the water; we shall see how it succeeds; a lucky outcome of this attempt might somewhat improve our difficult position. Our humour is pretty good although joking and smiling are not of ordinary occurrence. My young comrades hold out better than I had ventured to hope. The fact that during the last few days we have drifted towards the south at such a rate contributes decidedly, I think, to keeping up our courage. Our latitude on Sept. 12 was 81° 21′ *Page 94* and on the 15th we had drifted with a strong NW wind down to 80° 45′. The longitude in the latter case is, I am certain, considerably more easterly. Thus our drift in 72 hours amounts to about 2/3 of a degree of latitude and since then the wind has blown fresh from the same or a more northerly direction. Possibly we may get far enough south, and quickly enough, to obtain our nourishment from the sea. Perhaps too it will not be so cold on the sea as on the land. He who lives will see. Now it is time to work. The day has been a remarkable one for us because of our having seen land today for the first time since July 11. It is undoubtedly New Iceland that we have come in sight of. Its appearance is shown by the appended drawing.



Soundings taken 11.43 a.m. Sept. 7. Several large glacier blocks are visible in front of and along the glacier. The upper border very even and the arching of the island not broken by any peaks. The distance to the glacier estimated at 10 kilom. [6 miles].

There is no question of our attempting to go on shore, for *Page 95* the entire island seems to be one single block of ice with glacier cliffs. But it appears to be not absolutely inaccessible on the east and west points. We saw a bear close to the shore and in the water I saw a couple of flocks (of 4) of those "black guillemot youngsters." I think a couple of little auks were also visible. The ivory gulls are seen half a score together. On the other hand the water seems to be poor in small animals for dragging gave no result (landing-net). A seal was seen but it was much terrified. We have seen no walrus. Our arrival at New Iceland is remarkable because it points to a colossal drift, viz., of more than 1 degree of latitude since Sept. 12. If we drift in this way some weeks more perhaps we may save ourselves on one of the islands east of Spitsbergen. It makes us feel anxious that we have no more game within shooting distance. Our provisions must be quickly and heavily supplemented if we are to have any prospect of being able to hold out for a time.

Page 96 Sept. 18. Jubilee day was a lucky day for us. The weather was beautiful and our work went on quickly. I had succeeded in shooting another seal, this time with small shot. He was not quite dead but we got him anyway. Fearing that he would exhale all his breath at the last minute and go to the bottom I gave him a new small-shot cartridge in the back at very close range. These small shots were afterwards found between the blubber and the flesh and consequently had not had any deadly—if even damaging—effect. Then I cut up the seal and found among other things that the bones of the skull are as thin as egg-shell so that it should be possible to kill a seal easily with small shot in the head. Of the inner parts of the seal we have now tried and eaten the following: the brain, the intestines, liver, lungs, meat, blubber, kidneys, heart, stomach, contents of stomach, blood. We *Page 97* had the Swedish flag hoisted and finished the day with a ceremonial meal consisting of seal-meat with 1.5 Schum. bread, ivory gull with wine, chocolate (lactoserin) with Mellin's food and biscuit, Stauffer's plum-cake with syrup-sauce and wine, the King's health with hurrahs and national anthem, Boström's cheese with the butter and biscuits. The general feeling was one of the greatest good cheer and we lay down satisfied and contented. We had had New Iceland in sight all day to the westward, having drifted to its eastern side. The upper contour of the island was rounded like a loaf from that side too and the shore consisted of the edge of a glacier. We were within 1–2 kilomet. [1100–2200 yds] from this edge. S. measured the Λ height of the island 1° 25′, and S 45° W and N 47° W at 8 o'cl. Gr. Time was obtained in the morning by taking the bearings of the southern and northern ends of the islands. We shall see in the morning if we have altered this position essentially.

Sunday the 19th. Yesterday seems to have been the first link in a chain of jubilee days, for today we have succeeded in increasing our supply of provisions so much that it will last until the end of February. I managed to shoot 2 seals (small *Page 98* shot no. 00) and 1 great seal [*Phoca barbata*] (bullet) today. I cannot describe how glad I felt and how pleased my comrades seemed to be and how they looked forward to the future with hopes considerably strengthened. Most of the day we were busy cutting up, etc.; draining off the blood and storing it played a very large part. For we have found that F. can make excellent blood-pancake with seal-blood 300 gr [10½ oz.] and seal-fat 150 gr [5 1/4 oz.] cut into small pieces, 10 gr [1 oz.] flour and a pinch of salt and a pinch of yeast powder. In addition we have discovered that the weight of this mixture is not notably diminished in frying as is the case with meat, of which the weight when ready is about 1/3 less than the raw weight. Finally the pancake does not produce the revulsion which S. and I experienced for the first few days a couple of times when we ate seal meat and blubber. To a certain extent the pancake seems to supply the lack of bread. The best variety however is given by the ivory *Page 99* gulls of which F. has shot 1 today and S. 4 with two shots. We still drift but apparently slowly, for today we still have White Island in sight, our bearings for the day being on the average N & W for the two extremities. It presents a charming view in the sunshine which illumines the glacier both from the edge and from above, thus giving the island the appearance of being translucent. The edge of the glacier contains very blue glacier ice and also brown sections. Of surface moraines there is no trace and the only dark patches one can discover are shadows. These together with the formation in general show that the ground below the glacier is not altogether level. Large glacier-calves float round the island or stand there aground. We photographed the island. Today S. has been very busy house-building in accordance with a method he has invented. This consists of mixing snow and fresh water, after which the entire mass is built up into a wall and allowed to freeze. The work is both solid and neat. In a couple of days we shall probably have the baking-oven (i.e., the sleeping room) ready. The weather allowed us to obtain a place-line at 3 p.m. (local time) and this . . .

Page 100 The thickness of the ice of our floe at "the great cargo-quay" has been measured and found to be 1.4–1.3–1.5 m [4.6–4.3–4.95 ft.]

Sept. 20 turned out to be a regularly unlucky day. The cooking apparatus (Primus stove) which had hitherto not troubled us much suddenly became mutinous and refused to do service. The soup stood there mixed but could not be boiled. Great sensation. F. did this and that and experimented with blubber lamps but got so little heat that he thought it best to take the unburned fat out of the lamp and cut slices out of it which he laid on Schumacher bread and offered us. That was satisfactory for it tasted splendid—it tasted just like bacon and bread and we ate it willingly. By and by I succeeded in getting the apparatus so far in order that we managed though with some difficulty to boil the soup so that it could be eaten. It contained seal-meat 400 gr. [1.3 lb.] seal-blubber 150 [5.5 oz.], 50 gr. [2 oz.] Mellin's food and the rest water. After it had been boiled we ate it with gusto. The seal-meat seems almost to melt away on boiling, after boiling a few minutes it becomes extremely tender and *Page 101* delicate. Just when we had finished the meal and that untiring architect S. had gone back to building he cried out "A bear!" F. and I who were still sitting busy with our cook-stove difficulties hurried out and then had the pleasure of seeing a magnificent bear quite near us. S. and I were a little too eager I suppose for each of us missed, but F.'s one shot gave the bear his death-wound. Great joy. We had increased our supply of food to last on into April—to the close of winter—and in addition had obtained a magnificent skin. The bear is the Polar traveller's best friend. He had come to us from a little floe (2–300 m [660–990 ft.] distant) swimming through water so frozen that when we afterwards rowed out in it we had to force our way through the ice with oars and shovel. When he was shot he had just drawn back to his lead but I suppose he did not want to go in again and swim the long way back for he turned towards F. and seemed ready to attack. When shot he slipped down backwards into the water and at once gave up the ghost. We pulled him "to land" by means of a grapnel, then we got a noose around a hind paw and easily drew him out of the water. Our joy was great for the bear was a big and magnificent animal. He was treated accordingly, was given a noose *Page 102* around each front paw and one round the neck so that when being towed he glided along hair downwards and was dragged amid cheers to the camp. There F. and S. rapidly carried out the first part of the butchering while I returned to my tinker's employment. Before this, however, we had been out on the thin ice and fetched a large and peculiar bird (weight 1400 gr. [3.25 lbs.]) which I had brought down and which had been visible a couple of times before. Its description is this. Length from point of bill to end of tail 67 cm. [26 in.]. Length of one wing from root to tip along the front edge = 75 cm. [29.25 in.]. White beak with black point. Nearly all the feather covering striped across with light yellow-brown and dark grey-brown. The breast and belly dark grey-brown. The feet red. Web, three-toed, back-toe. S. and F. consider it can only be a young ivory gull and perhaps they are right.

A part of the island could be seen dimly in N. The trouble with the cooking apparatus was repeated during the evening although in a slighter form. We got the bear-steak and the bear-blood pancake ready. (275 gr. [10 oz.] br.-blood, 200 gr. [7.4 oz.] br. kidney-fat, 10 gr. [.37 oz.] flour, salt and y.-powder, a pinch of each). The latter however under extremely exciting circumstances. More than half the mass (the lower) was solid but the upper part was in a very *Page 103* fluid condition. The apparatus went out! Str. with matches raised. F. ploughs furrows in the bottom of the pancake in order to make the fluid part run down to the bottom and there solidify somewhat. The pancake was torn into pieces and turned as quickly as possible, and so on. The final result being a delicate cake. Then the cook-stove went out. But we had not had coffee and we wanted coffee and so the bother began again. Now all three of us were at work. F. held the cook-stove, S. held the matches ready, I stirred and managed the cleaning needle[1] and so we went on making the coffee with increasing hopes which at last were crowned with excellent coffee. Tomorrow we shall try to find out what it is that troubles the cooking apparatus. It was most unlucky that the reserve-parts for this were not brought with us from Pike's House! We have now so much meat, blubber, etc., that it is difficult for us to protect it well during the night in case of visits from bears. We pile it up near the edge of the tent and fence it round with all kinds of other things. The question of getting the house in order is becoming a burning one here in the cold. During the last two days the weather has been very pleasant but on the

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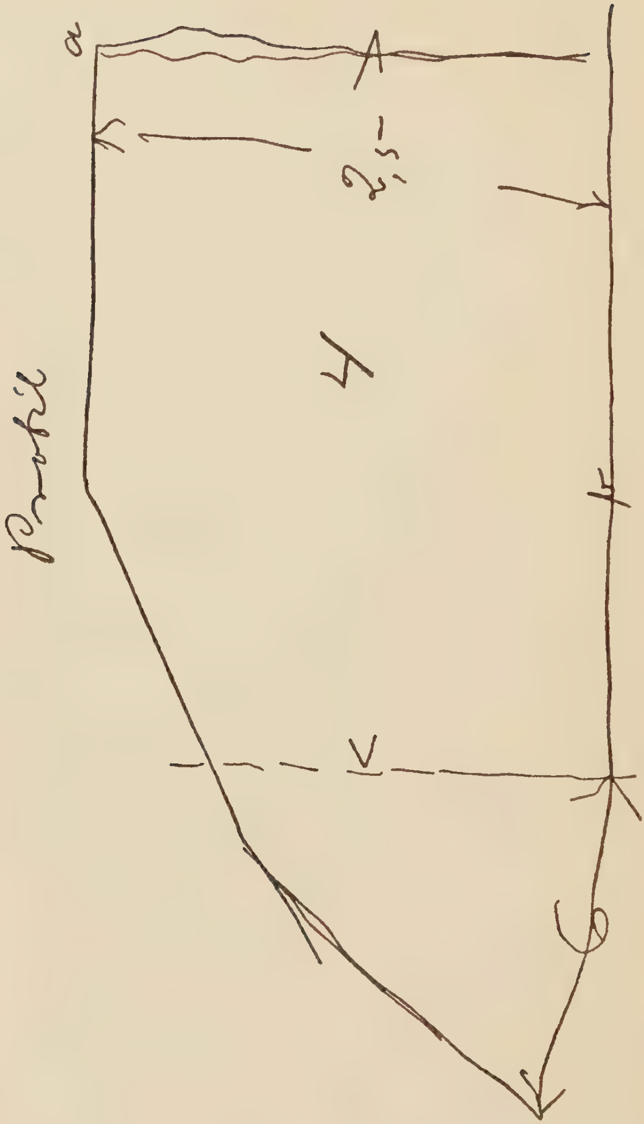
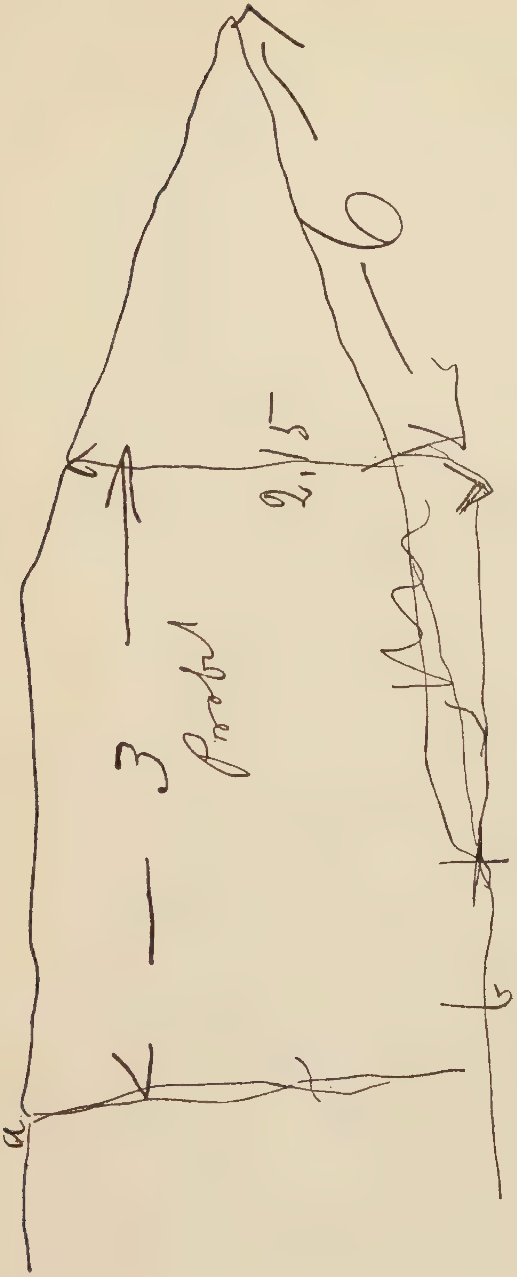
[1] Of the stove.—*Trans.*

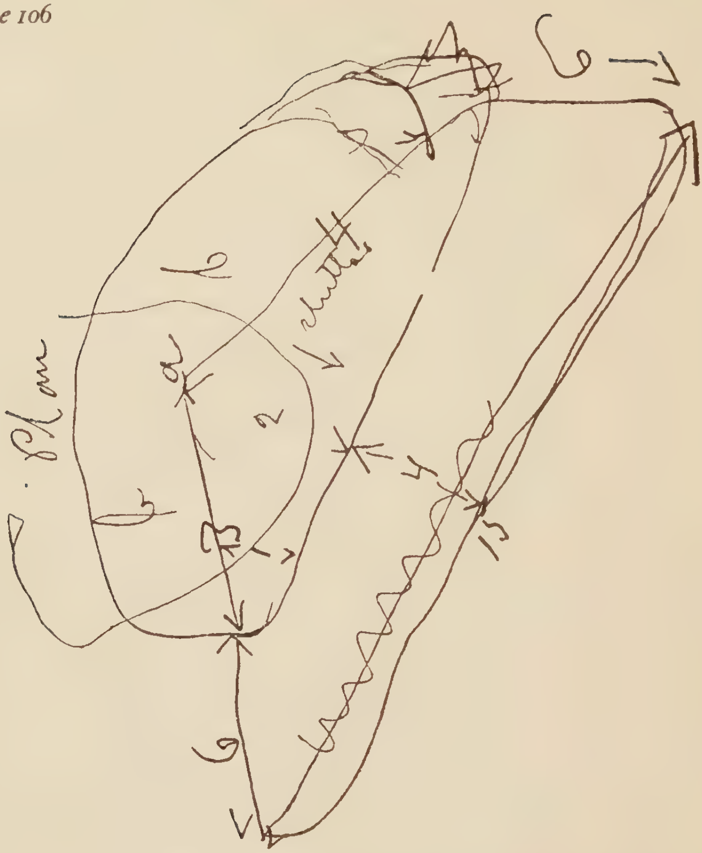
Page 104


a
2,5
4
Profil
V

Page 105


a
3
Probel
2,15
6
b

Page 106



Page 107 other hand they have not passed without signs of differences arising between us. I hope however that this seed will not grow and develop.

Sept. 21. Seal-blood pancake of frozen blood 275 gr. [10 oz.] in which is mixed a pinch of yeast powder and do. salt, 3 spoonfuls of salt water, 200 gr. [7.4 oz.] meat-bits and 150 gr. [5.5 oz.] seal-blubber. It was eatable after 8 minutes but was allowed to fry longer. We did not allow it to retain its cake form but stirred the mass while it was frying. It tasted excellent. The reason of the trouble with the cooking apparatus was found to be that some blubber-oil had got into the snowflake and stopped up the opening by means of large and sudden deposits of carbon. During the day S. and F. were at work most on the house. I cut up the seal and shot 3 ivory gulls. The day was short for we were tired after the previous long working day.

Sept. 22. Thick. of ice of our floe (another place than the one before) 2.5– 2.5– 1.7– 2.4– 3.0– 2.5 [7.25– 7.25– 5.6– 7.9– 9.9– 8.25 ft.]. Str. shot a seal (with small shot) and in addition we got a couple of ivory gulls but we must be careful with our shooting for we miss pretty often as the seals as a *Page 108* rule do not come so near that we can be certain of hitting the head with small shot. In . . . we were disturbed by hearing the floe break, as we thought, right under the building. We were afraid that we had run aground but our bearings have shown that we are moving although we seem unable to get away from this island. Probably we are lying in some kind of backwater which the current from the north creates at the S. eastern and S. western corners of the island and along its southern side. Clear weather here seems to be rare, we have not yet been able to get a clear latitude determination for ourselves and the island. The patchy black guillemots and ivory gulls are common here, we have also seen several specimens of the before-mentioned "ivory youngster." The ordinary fulmar on the other hand is seen remarkably seldom.

Sept. 23. Today all three of us have been working busily on the hut cementing together ice-blocks. We have got on very well and the hut now begins to take form a little. After a couple of more days of such weather and work it should not take long before we are able to move in. We can probably carry our supplies in the day after tomorrow. This is *Page 109* very necessary; as mortar we employ snow mixed with water and of this mass, which S. handles with great skill, he is also making a vaulted roof over the last parts between the walls. We now have a very good arrangement of the day with 8 hours' work, beginning with 2½ hours' work, followed by breakfast 3/4 and afterwards work until 4.45 o'cl. when we dine and take supper in one meal. We have now also tried the meat of the great seal and have found that it tastes excellent. One of the very best improvements in the cooking is that of adding blood to the sauce for the steak. This makes it thick and it tastes as if we had bread. I cannot believe but that blood contains much carbohydrate, for our craving for bread is considerably less since we began to use blood in the food. We all think so. We have also found everything eatable both as regards bear, great seal, seal and ivory gull (bear's-liver of course excepted). For want of time we have not yet *Page 110* been able to cut up and weigh our animal but I think we now have meat and ham enough to last on into spring. We must however shoot more so as to be able to have larger rations and to get more fuel and light.

Sept. 29. We are still lying off the south side of N. I. The ice-sludge has closed and the seals have disappeared. On the other hand the bears are coming. Yesterday and the day before we had visits from bears at night and I tried to hunt a bear in my stocking-feet but did not succeed. This morning just as we came out F. saw a bear which we succeeded in enticing to where we were waiting behind our hut. S. shot him through the throat and he fell down at once but after some moments he got up again and began running, pushing his fore-quarters in front of him across the snow. I then gave him my shot which laid him on his hind-quarters but this incited him to fresh efforts and he began to run. F. finally got his shot into him and at last the bear lay there in a pool, *Page 111* after which we hauled him up amid hurrahs. It was a big old he-bear. The night-bears seem to be a kind of marauder; the one that visited us last night dragged away our big seal twice and we should have lost it if S. had not succeeded in coming so near the bear that he frightened him and made him drop his booty.

Our floe is diminished in a somewhat alarming degree close to our hut. The ice pressure brings the shores closer and closer to us. But we have a large line of old hummocks between the hut and the shore and hope that this will stop the pressure. The sounds are magnificent when there is pressure but otherwise it does not appeal to us.

Thickn. of ice 1.1– 1.2– 1.5– 1.9 [3.6– 3.9– 4.95– 6.27 ft.] have been measured by a new fissure which has arisen in our floe. Yesterday evening the 28th we moved into our hut which was christened "home." We slept there last night and *Page 112* found it rather nice. But it will become much better of course. We are obliged to have the meat inside to protect ourselves against the bears. The ice in N. I. glacier is evidently stratified in a horizontal direction. The day before yesterday it rained a great part of the day which I suppose ought to be considered extremely remarkable at this time of the year and in this degree of latitude.

Oct. 1 was a good day. The evening was as divinely beautiful as one could wish. The water was filled with small animals and a bevy of 7 black-and-white "guillemot youngsters" were swimming there. A couple of seals appeared too. The work with the hut went on well and we thought that we should have the outside ready by the 2nd. But then something else happened. At 5.30 a.m. (local time) on the 2nd we heard a thunderous crash and water streamed into the hut and when . . . rushed out we found that our large beautiful floe had been splintered into a number of little floes and that one fissure had divided the floe just outside the wall of the hut. The floe that remained to us had a diam. of only 24 meters [80 ft.] and one wall of the hut might be said *Page 113* rather to hang from the roof than to support it. This was a great reversal in our position and our prospects. The hut and the floe could not give us shelter and still we were obliged to stay there for the present at least. We were frivolous enough to sleep in the hut the following night too. Perhaps it was because the day was rather tiring. Our belongings were scattered among several blocks and these were drifting here and there so that we had to hurry. Two bear-carcasses, representing provisions for 3–4 months, were lying on a separate floe and so on. Luckily the weather was beautiful so that we could work in haste. No one had lost courage; with such comrades one should be able to manage under, I may say, any circumstances.

* * *

Pages 114–118 contain a tabulation of the weight of the instruments carried, a list of the contents of Strindberg's front basket on September 13, a report of the level-sextant observations for July 13, and a calculation (difficult to decipher) of the balloon's position on July 12.

Andrée's Second Diary

(ALL THAT WAS DECIPHERABLE)

Page 1 897
. . . . . . with cutti[ng] . .
. . . . beginning of a
. . . . the hut hung
. . . . the day passed
. . . .
. . . . . . imp . . vation
. . . . to
. . . . all too
. . . . we there as a matter of
. . . . . . a not unimportant
. . . . . . of the island correctly. But
. . . . could with
. . . . the lowland. The question
. . . . here with everything
. . . . t . . we first
. . . . to reach
. . . .
. . . .
. . . . . . of . . . . .
. . . . should
. . . . and up
. . . . on the island.

Page 2 In the evening 5 b . . . . . .
Riders or geese . . . .
5th in the morning . . . . . .
the previously mentioned . . . . .
we had . . . .
lucky that we . . . .
there and . . . .
ing it . . . .

I . . . t . . . .
. . . .
along the glacier . . . .
from the glacier . . . .
our hard . . not . . . .
even if late at night . . . . . .
the day's energetic labour . . . .
middle of the night . . . . . .
. . for the (flaming) . . outside . .
northern lights neither . . . . .
warmed . . . .
. . . k . . . .
. . . .
. . . my . . . .
We christened o[n] [acc]ount . . .
of this the district . . . .
the place to "M . . . . . place".

Page 3 . . . . . . during the day the 6th
. . . . . heavy wind w . . . .
. . . . could not . . much
. . . . . undertook however a short
. . . . we at last
. . . . Swedes
. . . . to be the
. . . . icy
. . . . at once interes-
. . . . we . . . high
. . . . from the sea found
. . . . All the ground
. . . . stone-brash
. . . . of the gravel was
. . . . Granite lay partly
. . . . great walls [ridges?]
. . . . which however were
. . . . If . . could
. . . . whole
. . . . (large)
. . . . in darkness.
. . . . . . in the snow-

hut . . . . transport of the goods
the . . . . neighbourhood. This was
a heavy . . . . was done

Page 4 . . g was busy . . . . at . . . .
feared that . . . .
such with . . . .
which we f . . . .
of it . . . .
rings . . . .
cier . . . .
had set foot . . . .
if it possibly . . . .
to look at tr. . . . .
the glacier . . . .
ought I think . . . .
than one . . . .
the visible . . . .
the sea but . . . . . k . . . . .
not since . . . .
to. Our . . . .
s . . . .
worth . . . .
. . . mon with . . . .
and intestine . . . . . . envious
now give . . impression . . innocent
white doves but of . . . . l carrion
birds . . . .

Page 5 . . . . bad weather and we fear . . .
. . . . we keep in the tent the whole day
. . . . so that we could
. . . . on the hut.
. . . . to escape
. . . . like
. . . . out on the sea
. . . . crash . . . grating
. . . . driftwood
. . . . to move about a little
. . . . ermits

Marginal Notes on the Calendar Page of Strindberg's Almanac

July		
11 S. 12 M. 13 Tu.	In the balloon	
14 W.	Landed	
16 F. 17 S.	Work on the sledges and the boat. Nice days.	
19 M.	First bear shot and cut up	
22 Th.	Began our sledge journey	
25 S.	Anna's birthday	
26 M. 27 Tu.	Bear Bear	quiet and altered the equipment looked at my sledge and diminished the load from 200 to 140 kg. per sledge.
August		
1 S.	Good march 8 km.	
2 M.	Summer-day bad ice. Bear	
9 M.	Bear showed himself but has gone	
10 Tu. 11 W.	Passed 82° lat. Feast-day	
13 F.	3 bears.	
19 Th.	Bear (1 [or 7?] a.m.) caught [?] at supper Lunar distance [?]	
21 S.	3 bears just at entrance of tent of which one got away. The mother was killed by me with one shot.	
22 S.	Bad country [?] [Illegible] minus 4 temp. [? illegible]	
September		
13 M. 14 Tu. 15 W.	Quiet on account of bad weather and snow	
16 Th.	Resolved to remain on ice-floe	

18 S.	Feast
19 S.	Hunt
21 Tu.	Bear
23 Th.	Working at snow-hut
29 W.	Moved into the hut although it was not ready
October	
2 S.	Our ice-floe broke close to the snow-hut during the night
3 S.	Exciting situation
4 M.	
5 Tu.	Moved to land.
6 W.	Snow-storm reconnoitring
7 Th.	Moving
17 S.	Home 7.05 a.m.

Strindberg's Memorandum Almanac
(Notes on the Flight)

The following notes on the start and the flight, July 11–14, were written on the memorandum pages bearing the dates July 25–October 26. The pages have here been renumbered from 1 to 37. Brackets [ ] indicate words originally written down, then crossed out or altered. Otherwise the original spelling and punctuation have been retained, in so far as these could be indicated in translation. Some series of observations and numerical jottings of little importance have been omitted from the final revision.

Page 1[1] Self-regist. baromet. from beginn. at 750 mm
5566
Good-bye is said 1.50 G.M.T.
Enter car 1.52 G.M.T.
start 1.55
Guide-rope lost
Holländar Naze 2.05
Across Vogelsang Island 2.23
h = 600 meters North Point 2.27
Mists are forming.
2h 29m (+) 1.0 (+) 0.4
Silent and still
Average speed 0.57 km/minute.
2.33m 15s drag-rope touches the water
Course N 57 E. A ballast-line drawn up 2.45 (C 66)

Page 2 Photographs were taken at the times given on the photographs.
The first two had wrong focus.
N.B.! Self-registr. barom's
2h 5m = C 66 2h 59m

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[1] Fl. = Frænkel; Aée. = Andrée; C. = Chronometer; G.M.T. = Greenwich Mean Time. Measurements and temperatures are in the metric system. One meter = 39.37 inches; 1 kilogramme = 2.2 lbs.; 0° Centigrade = 32° Fahrenheit.—*Trans.*

My tin with farewell words to Anna thrown down on Vogelsang.
3.03 gas is lost at height of 500 m. Course somewhat more northerly during journey at great height.
Clouds round about except in N E over Spitsbergen.
Bearings 3m 12s (C 66)
Point nearest Wijde Bay = S 311° W
North Point Vogels S 55° W
Page 3 1st bottle of ale 3.21
Ice in north along the horizon
We must now work at splicing the drag-line.
At height of 500 m direction of wind direct from S 20° W
Bearings of same points as before 4.03 o'clock
S 47° W
S 337° W
The ice which was before visible, is now (4.15 o'cl.)
clearly seen in N and N W
Looked out in vain for the steamer
4.26 faint mists begin
photograph at 4.25 o'cl. of the first ice that is seen
Page 4 at distance of . . .
4.30 bearings of the same points
347
44
Drag-line ready spliced 4.33 o'cl.
The inland ice is seen beautifully on E side of Wijde Bay?
4.42 + 5.9 + 3.2
Frænk. in the car
"Look out Frænkel."
"What's up?"
"You'll get a showerbath!"
"All right!"
Soon near ice
5.03 Photograph of the ice.
Just then passed the corner of the ice.

Page 5[1] Follow the edge of the ice at about 500 m distance 5.37 o'cl.

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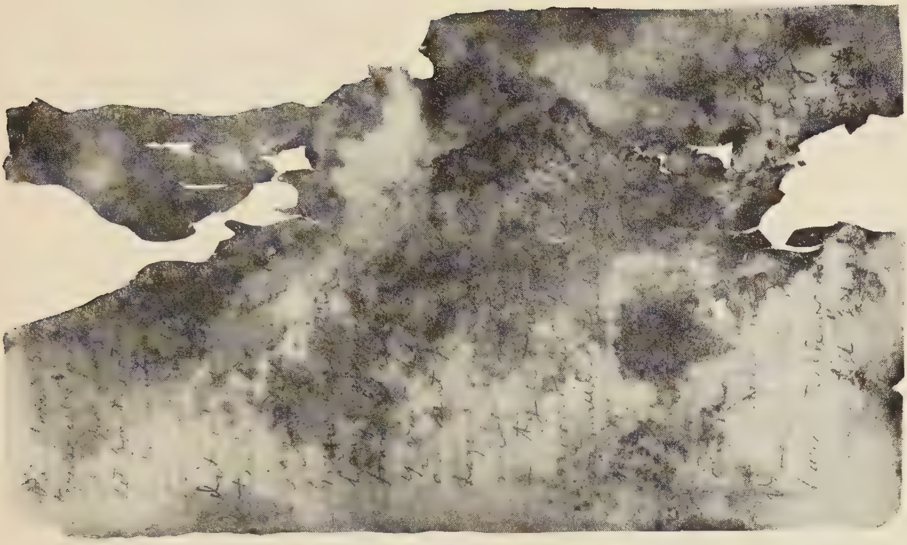
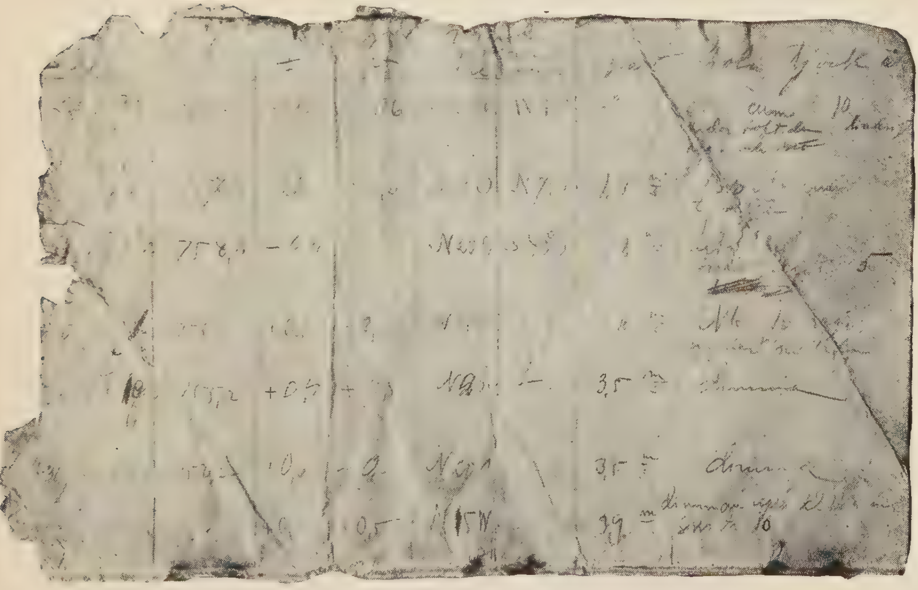
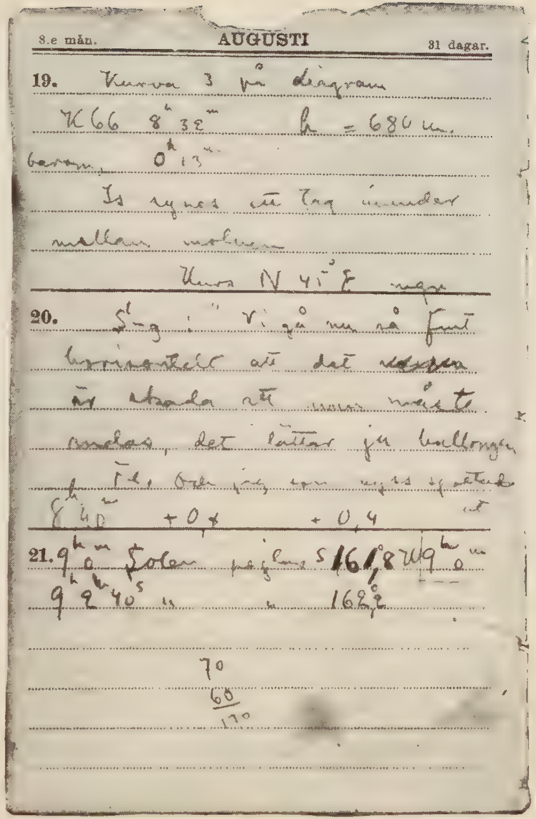
[1] From this page there has been omitted a series of level-sextant observations—*Ed.*



PAGE 2 OF ANDRÉE'S SECOND DIARY
Deciphered with the aid of infra-red rays



A PAGE FROM FRÆNKEL'S METEOROLOGICAL JOURNAL JULY 28–31, 1897



8.e mån. **AUGUSTI** 31 dagar.

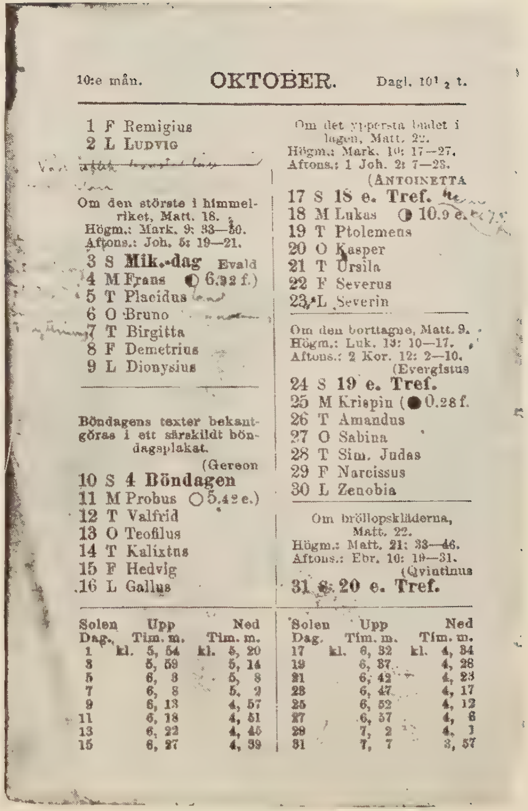
19. Kurva 3 på diagram
K 66 $8^h 32^m$ h = 680 m.
barom. $0^h 13^m$
Is synes åt tag imellan
mellan molnen
Kurs N 45° E ungef.

20. S-g: "vi gå nu så fint
horisontellt att det [illegible]
är skada att man måste
[illegible], det lättar för ballongen
f. ä. Och jag som [illegible]
$8^h 40^m$ +0,8 +0,4

21. $9^h 0^m$ Solen pejlas S 161,8 W $9^h 0^m$
$9^h 2^m 40^s$ " " 162,2

70
60
170

Notes on the first, "high-level" phase of the flight



10:e mån. **OKTOBER.** Dagl. 10½ t.

1 F Remigius
2 L Ludvig

Om den störste i himmelriket, Matt. 18.
Högm.: Mark. 9: 33—50.
Aftons.: Joh. 5: 19—21.

3 S **Mik.-dag** Evald
4 M Frans ◐ 6.32 f.)
5 T Placidus
6 O Bruno
7 T Birgitta
8 F Demetrius
9 L Dionysius

Böndagens texter bekantgöras i ett särskildt böndagsplakat.

(Gereon
10 S **4 Böndagen**
11 M Probus ○ 5.42 e.)
12 T Valfrid
13 O Teofilus
14 T Kalixtus
15 F Hedvig
16 L Gallus

Om det yppersta budet i lagen, Matt. 22.
Högm.: Mark. 10: 17—27.
Aftons.: 1 Joh. 2: 7—28.

(Antoinetta
17 S **18 e. Tref.**
18 M Lukas ◑ 10.9 e.
19 T Ptolemeus
20 O Kasper
21 T Ursila
22 F Severus
23 L Severin

Om den borttagne, Matt. 9.
Högm.: Luk. 13: 10—17.
Aftons.: 2 Kor. 12: 2—10.

(Evergistus
24 S **19 e. Tref.**
25 M Krispin (● 0.28 f.
26 T Amandus
27 O Sabina
28 T Sim. Judas
29 F Narcissus
30 L Zenobia

Om bröllopskläderna, Matt. 22.
Högm.: Matt. 21: 33—46.
Aftons.: Ebr. 10: 19—31.

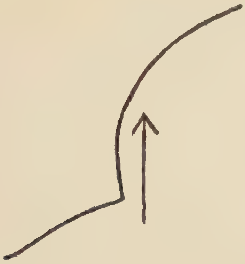
(Qvintinus
31 S **20 e. Tref.**

Solen Dag.		Upp Tim. m.		Ned Tim. m.
1	kl.	5, 54	kl.	5, 20
3		5, 59		5, 14
5		6, 3		5, 8
7		6, 8		5, 2
9		6, 13		4, 57
11		6, 18		4, 51
13		6, 22		4, 45
15		6, 27		4, 39

Solen Dag.		Upp Tim. m.		Ned Tim. m.
17	kl.	6, 32	kl.	4, 34
19		6, 37		4, 28
21		6, 42		4, 23
23		6, 47		4, 17
25		6, 52		4, 12
27		6, 57		4, 6
29		7, 2		4, 1
31		7, 7		3, 57

Marginal notes on the calendar, October 2–17

LEAVES FROM STRINDBERG'S MEMORANDUM ALMANAC



Page 6 A seagull flying far below us 5.38
Descendons doucement par un sinusoïd
Spitsbergen disappears from sight in the fog.
A beautiful dark-blue colouring of the water, clearly distinct from the colour before.
Finely divided ice
Diagram 1 curve 2 tide = 1h 5m = C 66. 5.45
Four first pigeons are released 5.46 ocl. at height of 240 m.
Took direction approximately W
Shower of peas in the car when Aée put up the empty basket.
Page 7 Come over the ice in good earnest. The ice in somewhat larger pieces and sharply rounded
6 heur We pass ice newly broken
De Geer's level-mirror [1]
The first dinner consisted of sandwiches and broth with small bits of macaroni which they had brought with them warm.

$\begin{cases}\text{Course N } 32^\circ \text{ E} \\ \text{Speed } 9.05 \text{ m/s}\end{cases}$

—

s

6.20
As good as ice-free, except a line direct eastwards
Page 8 The ice consists exclusively of as good as ice without hummocks

---

[1] De Geer's level-mirror is employed to measure velocities. Some calculations and observations are omitted here.—*Ed.*

Without glacier-ice
A soft whistling for a long time in the large valve.
Only some birds otherwise no animals.
Quiet and hot in the sunshine.
The only sounds heard are some cries of birds and the whistling in the valve.
The ice gave a report.
6.50 Highland Point 327° S W
6.35 Aée pisses at the height of 600 m.
We rise probably on account of this throwing out of ballast
Mists begin below 7 o'cl. Northwards fogs.

Page 9 Course at height of 600 m N 45° E
Aée goes to his berth 7.15
7.35 Course N 40° E.
7.45 o'cl.
We are floating onwards above a thin layer of clouds through
7.45 which the ice can be seen now and then.
Height 680 m about 7.49 t = (+) 1.0° (+) 0.4°
height 700 m

Page 10 The ice is visible only along the horizon in SSW. The clouds beneath us are denser. Silent and still. Only a faint breeze from SE and E and whistling in the valve. The sun is hot but a faint breath of air is felt now and then. Aée is sleeping Fl. and I converse in a whisper. 8.08. Distant land in SE. North-East Land probably.
8.15 The clouds contin. to go somewhat more to the eastwards than we.
The course and speed cannot be determined for we do not see the ice beneath us.
The sky above us has been clear all the time.

Page 11 Ice is seen a moment below us between the clouds
Course N 45° E magnet.
S-g: "We are now travelling horizontally so finely that it is a pity we are obliged to breathe as that makes the balloon lighter of course.
And so Fl. and I went and spit, too 8.40 + 0.8
— + 0.4
9.00, bearings of sun S 161.8° W 9h 0m
9h 2m 40s " " " 162.2°

Page 12 July 11, 1896
At 9.41 Frænkel's and Strindberg's available quantities of urine are thrown out.
9.52 touching the upper edge of cloud at height of 500 m
1 buoy goes overboard with about 8 kg [17.6 lbs.] sand.
9.55 A shot? is heard
10.01. See ice through the clouds still scattered ice.
(0.5 diffusion)
Page 13 Ice visible a little while 10.09.
Approximate course N 60° E.
Ice visible a moment 10.25 o'cl. Same scattered ice.
10.31 o'cl. 5 rungs of rope-ladder thrown out.
10.35 a somewhat larger opening in the clouds
Course N 65° E magnet.
10.39 6 rungs of rope-lad. thrown out
10.40 Additional 8 kg. ballast from same sack.

Buoy No. 7

This buoy is thrown out from Andrée's balloon at 10.55 p.m. G M T on July 11, 1897, in about 82° latitude and 25° long. E fr. Gr.
Page 14 We are floating at height of 600 m. All [right] well
Andrée Strindberg Frænkel
11.12 o'cl.
Clouds go at a height of no more than 470 m. [1528 ft.]
11.13 temp. 0.6° 0.3°
11.20 Cloud or land ? N 70°E
Float at height of 460m It was cloud
Course 11.48 N 84°E
Page 15 11.55 o'cl. It looks like water and ice along the horizon in E but it is only the shadow of an alto-cumulus cloud in E. Its extension is about 90° from immediately below sun to N 110° E.
12.20 Course N 90° E
We enter the shadow of Alt cum.
Guide-roping since 12.24. Sailing onwards in slight fog
The sun has gone, but we keep a very level course.
100 m. [325 ft.] in 30 sec
Course 90° E = E.
Guide-roping across the ice at a height of between 100 and 20 m.

12 kg [26.4 lbs.] thrown 1.10
1.25 A bird black in the distance Ice-leads (the large ones) in a direction N 80° E.
Page 16 The fog prevents us from seeing farther than abt. 2–3 km in any direction.
Ice and water the ice 0.9
We have lain still since 1.35
Buoy thrown out
I pooped for 1st time Thrown down on to ice-bit
Puff of wind fr. S S W
Slept until 7.15
Page 17 7/11 19.40 o'cl. Course N 35° W
Aée's 6.50 still until 7.32
W 7h 32m
19h 45m (C. 66) speed = 2.6 m/s
Course N 75 W
The air misty. Outlook not more than 1 km. in all directions.
Still the same ice.
8h = 2.5 m/s
Page 18 Cooking apparatus is loaded with coffee at 8 o'clock and is let down
At 8.07 o'cl.
N 70° W
8.36
65 m in 211 sec. = 3.1 m/s
"The universal barrel" day-stool and night-stool
N 80° W
Coffee-breakfast together
9h 9h 30m G M T
Aée sucked the can-opener with which the cream had been opened.
Pleasant feeling prevails
10h = 22h S 80° W course
Speed 3.0 m/s
10.10 (C.66) Sun-altitude taken with level sextant and
Page 19 Aée's chronom. The sun then visible through the fog.
Course N 90° W
11.20 o'cl. = 5.2 m/s
The pigeons start 11.22 One tried in vain to sit on the drag-

line. Circle a moment. 2 settle on the ice.
Then they disappeared in the fog.
11.30 Course 70° W
Psychrom. (+) 0.2° (+) 0.1°
dry wet

Page 20 July 12
0 o'cl. (C.66) we pass a field of ice above one km in extent.
The snow on it almost melted. Full of fresh-water lakes on it.
Course N 60° W 0.05 o'cl.
0.10 temp. (+) 0.1° dry 0.0° wet.
Speed, 3.7 m/s
Still slight mist
Fine drizzle 12.15 o'cl.

Page 21 July 12
1h 10m o'cl.
Average speed, 3.55 m/s

Page 22 Mean height 35 meter [114 ft.].
1.58 o'cl. there is passed a channel about 80–90 m [260–295 ft.] wide extending N and S as far as one could see (2 km)
temp. 2.08 o'cl.
(+) 0.6 (+) 0.4
at height of 40 m
speed 2.30 o'cl. = 3.0 m/s

Page 23 Blood-red ice perhaps a relic of a bear's meal.
3 p.m.
dry wet
3 p.m. G M T temp. + 0.6 + 0.5
Course westerly (direct, magn.)
3.15 the car struck the ground twice.

Page 24 The drag-line chopper and 25 kg [55 lbs.] sand and div. small ropes were thrown out 1 little iron anchor and a little block.
3.25
3.55 A ballast-line and the scraper
5 o'cl. the big buoy went without communication
Hard and continuous bumps against the ground resulting from the fog that weighs down.
5.15 Speed 2.6 m/s
Course S 80° W

Page 25 Place-lines July 12, 17 to 18 o'cl. [5–6 a.m. the 13th]

mean 5h 45m 7s 22° 46′
Page 26 (Level sext. and C. 66)
6h 11m 26s 23° 39.3′
Page 27 June 12, 21.05 o'cl. temp.—0°.6 on dry. Wet remains at 0° and does not descend.
Direction of the wind N 60° W
velocity 3.6 m/s
Height of car then 60 m.

In the morning the fog lightens enough to allow the sun to peep through. Now and then blue patches a refreshing sight after all the "stampings" during the night. The carrying-power of the balloon also increases finely. I wonder if there will be a high-level flight? But one of the drag-ropes has *Page 28* caught behind and under a block of ice and as the wind swung round 90°–100° afterwards we have stayed here the line fastened very well.

The sun disappeared in Str. Cum.
22 o'cl. Veloc. of wind 5.2 m/s
Direct. of wind N 65° W
Called Fl. 10.30 o'cl. (C. 66)

Began to move of ourselves with a jerk which knocked us against the ground
11.04 o'cl. C. 66 Course S 80° o
Page 29 12 o'cl. [Speed] = 3.0 m/s

Taken while Chateaubriand is boiling in the Göransson cooking apparatus.

diner du 13 Juillet

Potage Hotch Potch
Chateaubriand
The King's Special Ale
Chocolate with biscuits
Biscuits with raspberry syrup and $+ H_2O$

A good and invigorating meal!

Saw bear-track just after midday. This morning I put on snowboots with woollen stockings first and then wool-and-hair stockings inside and I find this to be a warm and pleasant footwear.

Page 30 Speed o'cl.
1.30 (C.66) 3.0 m/s

[3 lines of short-hand] Up in the bearing-ring it is confoundedly pleasant. One feels so safe there and so at home. One knows that the bumps up there are felt less and this allows one to sit calmly and write without having to hold on.

In the bearing-ring the vibrations from the drag-lines are felt somewhat (they are not felt at all in the car) but on the other hand the bumps against the ground are felt much less.

Page 31 2.15 o'cl. Fog with fine drizzle, which settles in the form of hoarfrost on the ropes.
A bump or two against the ground.
Andrée is lying in the car to sleep but I expect he will not get any proper rest.
The sun vanished in the fog.
2.30 Incessant "stampings"
2.40 Speed = 2.7 m/s
The course is direct
easterly (declination)

Page 32 My (S–g's) clothing equipment, in which I am dressed July 13, 1897, is:
one Jaegar-wool jersey
" " " hunting-shirt
A pair " pants
A Blue "army suit"
" wool-lined leather waistcoat
A pair of rather thin woollen stockings
" " wool-and-hair stockings
One cap (woollen)
A pair of fur-lined snowboots
" " " woollen mittens
2.45 Buoy No. 9 and a medicine-chest thrown out.
The guide-lines act well and "scrape back" to their proper places if they happen to cross each other.
Course

Page 33 4.42 o'cl.
A pigeon has returned and has circled a few times in the neighbourhood of the balloon.
Close "touches," "touches."

8 p.m.
Course easterly (declination)
Speed, 3 m/s
Course N 70° E

Page 34

6 little buoys	12
Winch	16
Sand	75
Barrel	5
Div. provis.	200

Speed o'cl.
7/13 9.30 p.m.
3.0 m/s
I tried to lie down in the car at 7 o'cl. but in consequence of the bumping I became seasick and vomited. Fire.

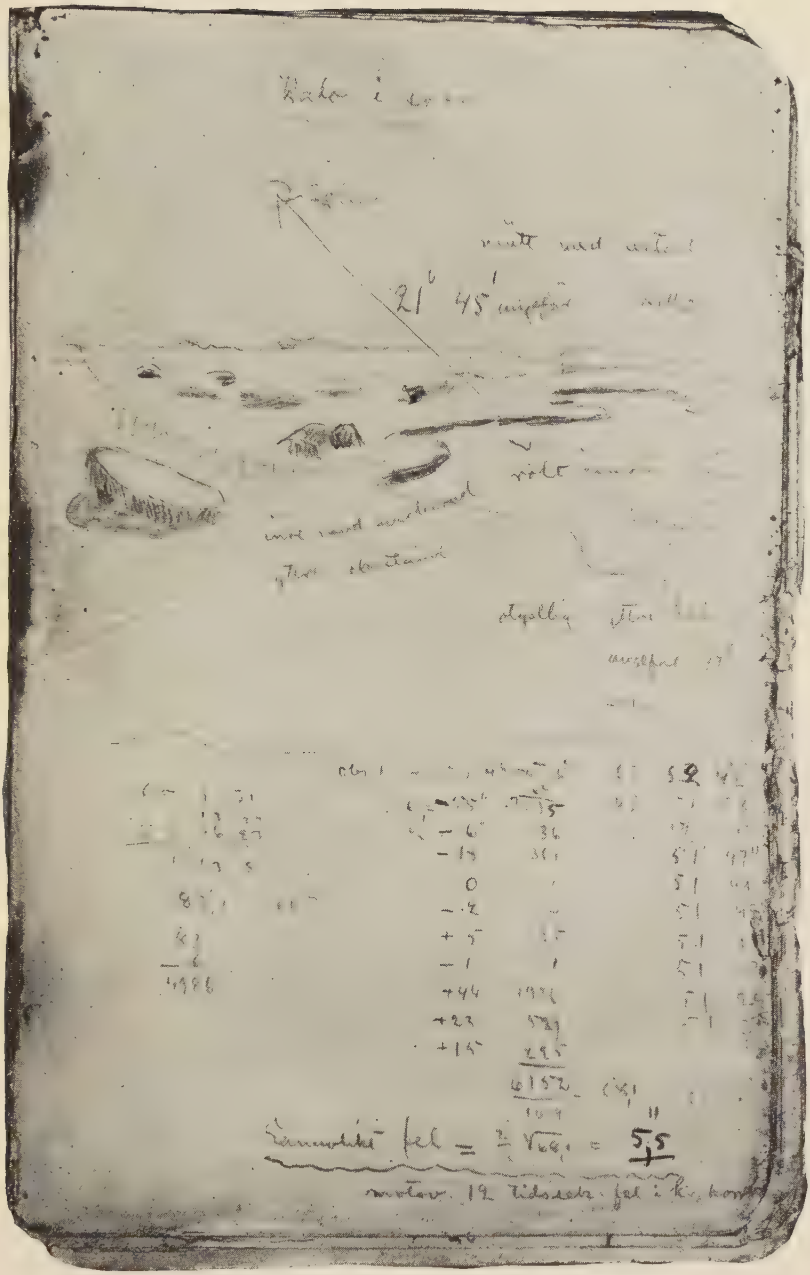
Page 35 Afterwards went up into the bearing-ring with Fl. threw provisions as ballast Fl. afterwards went to lie down at 9 o'cl. I took altitude of sun together with Aée, he was down in the car, I in the bearing-ring.

Then I opened my clothes-sack and put on an additional pair of balloon-cloth trousers and an Iceland jersey intending to sleep.

First I read Anna's last letter. It was a really enjoyable moment.

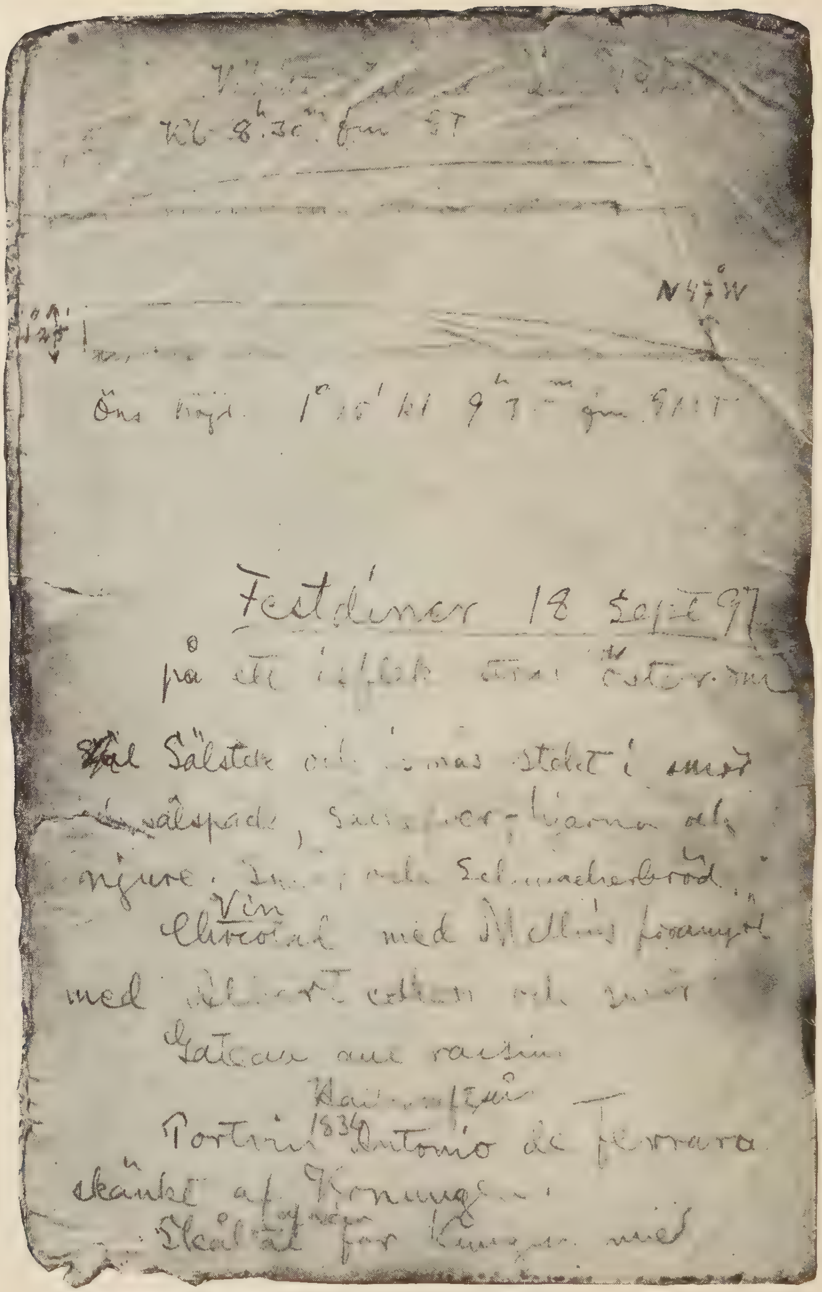
Page 36 Heavy shocks.

Page 37 Anchored on an ice-floe
7.30 a.m. July 14 = July 13 about 19h 30m
Place-determination of the anchoring-place 10 o'cl. July 14



A PAGE FROM STRINDBERG'S FIRST LOGBOOK

Showing the "snow-halo" observed on August 22, 1897



[illegible]

Kl 8h 30m f.m. ST

N 47° W

12.5

Öns höjd 1° 15' Kl 9h 7m f.m. St. T

Festdiner 18 Sept 97
på ett isflak [illegible] öster om

~~Säl~~ Sälstek och ismås stekt i smör
och sälspäck, [illegible]-hjärna och
njure. [illegible] och Schumacherbröd.
Vin
Chocolad med Mellin's food
med Albert-cakes och [illegible]
Gateau aux raisins
Hallonsaftsås —
Portvin 1834 Antonio de Ferrara
skänkt af Konungen.
Skålat och tal för Kungen med

PAGE OF STRINDBERG'S SECOND LOGBOOK, SEPTEMBER 18, 1897

See text for translation

Strindberg's Logbooks

Logbook I

In this book, one of whose early pages bears the title, "Observations during the Sledge Journey, 1897," Strindberg has recorded mainly astronomical and other observations for the period July 15—September 4. There are, besides, the following notes on food inventory, the equipment carried on the sledges, and rationing.

Provisions.[1]

72 big tins biscuits and bread
14 small boxes of biscuits
2 boxes of Bovril
1 Pemmican
73 milk
12 lactoserin
24 Rousseau meat-powder
20 butter
13½ tins Cloetta meat-powder cocoa
9 big round (5 butter 4 whortleberry)

1 apple
1 sugar

¼ of this	1/5 of this
18 big	14
4 small	3
18 milk	15
3 lactoserin	2
6 Rousseau	5
5 butter	4
3 Cloetta	3
2 big Round	2

Stock-taking of the provisions on my sledge Aug. 5 at 3 a.m.
Front basket.

3 kg. [6.6 lbs.] Cocoa powder "Extract" (Mosquera)
4 tins butter (3.6 kg) [7.9 lbs.]

---

[1] This list is preceded by a series of observations taken on July 17 and 19.—*Ed.*

1 kg [2.2 lbs.] coffee
1 bottle raspberry syrup
Biscuits 1 Cracknel
  1 Albert
  1 Congo
5 Hardtack
1 tin Sugar (5 kg) [11 lbs.]
1 " Snowflake
1 " Stauffer preparation
1 " Chocolate and lime juice
1 " (1 kg) [2.2 lbs.] whortleberry
4 small boxes of sardines

Rear basket.

3 tins Mellin's food-powder 9 kg [19.8 lbs.]
2 " Hardtack
2 Albert
1 Cracknel Biscuits
1 Oscar
2 Snowflake
1 Pemmican 3 kg [6.6 lbs.]
2 Cocoa-powder Extract (Mosquera)
4 Butter
2 Milk
5 Lactoserin
1 Paste (liver)
1 Soup-tablets

Load on my sledge.

44.5 Aug. 10, 1897.

Front basket	44.5 kg	[97.9 lbs.
rear basket	46	101.2
Private sack	16	35.2
3 pair of snowshoes	6	12.2
Boathook	1.5	3.3
Spade	1	2.2
Grapnel with line	2 kg	4.4
Sack of tools	8 kg	17.6
Photograph. app.	6 "	13.2
Stand of theodolite	1.3	2.9
	132.3	291.1

Boot-grease	2.5	5.5
Sewing things	4.9	10.8
Small field-glass	0.3	0.7
	140.0	308.1
Large field-glass	1.0	2.2
	141.0 kg	310.3]

Find of leaves, plant-parts, bird-feathers, clay, sand, stones, etc.
Aug. 10, 4 p.m.

The ice hard, uneven, with yellow patches,
but little covered with snow, greyish with hollows.
near the find-place

Thickness of the ice below the water	1.05 [41.4 inches]
The find lay in a hollow 20 cm. [7.9 in.] deep	1.05
and 50 cm. [19.7 in.] in diameter	1.35 [53.2 inches]
	1.35
	1.35
	1.05

Stock-taking Aug. 25, 2 a.m.

front basket	*rear basket*
1 Congo	1 Albert
4 Hard bread	1 Cracknel
6 Snowflakes [?]	1 Oscar
3 Cloetta	3 Mellin's flour
2 small coffee	2 Hardtack
1 Sardines	2 Snowflakes
3 butter	1 pemmican
1 lime juice and Chocolate	4 Lactoserin
1 meat 5 kg. [11 lbs.]	2 Milk
1 Sugar 4 kg. [8.8 lbs.]	3 butter
1 Whortleberry	2 Cloetta
1 raspberry syrup	1 Paste
1 Stauffer and 4 sardines	

All up 2.30 a.m.
Start 5.45 a.m
Midday rest 10.30–11 a.m.

Pitch tent 2.15 p. m.
Silence in camp 5.30 p.m.

Repas pendant le voyage

Aug. 4, 4 p.m. G.M.T. Breakfast	Bear-beef with hardtack Lactoserin cocoa with biscuits
Aug. 4, 10 " " Dinner	Biscuits, butter and cheese, snow-water
Aug. [5], 4 a.m. " Supper	Bear broth with Potage d'Oseille (Stauffer), sandwiches, Biscuits with cherry syrup and water.
Aug. [5], 6 p.m. Breakfast	Mixed bear's-meat (ribs chops and kidney) bread ¼ pieces Coffee with biscuits (6 st Mi [?])
Aug. 6, 2 p.m. Dinner	Biscuits (7) bread (8) butter water
Aug. 6, 9 a.m. Supper	Bear's-meat, mixed ¾ kilo [1.7 lbs.] bread and biscuits. Mellin's food gruel
Aug. 7, 9 p.m. Breakfast	Bear's-meat, mixed ¾ kilo bread [?] Coffee with biscuits (6)
Aug. 7, 5 a.m. Dinner	4 bread and 7 biscuits with butter each, water
" 7, 11 a.m. Supper	1 kg. [2.2 lbs.] bear's-meat, purée of peas (Stauffer) with bread and biscuits for 3
Aug. 8, 1 a.m. Breakfast	Bear beef (of 0.9 kg [2 lbs.] meat) with 2 pieces of bread each. Lactoserin cocoa with 6 biscuits each.
Aug. 8, 9 a.m.	Ordinary ration bread, butter, cheese and biscuits.
Aug. 8, 12.30 p.m.	Bear's-meat (0.4 kg [.9 lbs.] pr man) with 2 pieces of bread Mellin's food gruel with biscuit.

Aug. 9, 3 a.m. Breakfast	Bear's-meat (0.27 kg [0.6 lbs.] per man) with 2 pieces bread. Coffee (1 heaped tablespoon together with old grounds and 1.5 litre [1.3 quarts] water and a little milk) and biscuits.
Aug. 9, 10 a.m.	Bread, biscuits, butter, cheese.
Aug. 9, 6 p.m.	Cloetta meat-powder, chocolate and bread biscuits and butter.
Aug. 10, 8 a.m.	Bear's-meat and bread food gruel.
Aug. 10, 4 p.m. Dinner	Hardtack and butter sardines, Biscuits butter cheese.
Aug. 10, 10 p.m. Supper	Bear's-meat (0.75 kg [1.7 lbs.]) with Batty's sauce, broth and biscuits, Almond tart (Gâteau d'amandes) Stauffer.
Aug. 11, 10.30 a.m. *Morning*	Bear's-meat and bread Coffee and biscuit
" 11, 8 p.m. Dinner	Bread, butter, and biscuit.
" 12, 2 a.m. Supper	Bear's-meat (0.75 kg [1.7 lbs.]) Lactoserin cocoa.
Aug. 12, 1.30 p.m. Morning	Bear's-meat (0.7 kg [1.5 lbs.]) and ivory gull (lact Mellin's food gruel
Aug. 12, 8.30 p.m. Dinner	Bread butter biscuit cheese
Aug. 13, 2 a.m. Supper	Bear's-meat (½ kg [1.1 lbs.]) 2 pieces of bread per man Potage au Cerfeuil Stauffer and biscuits (6 each).
Aug. 13, 2 p.m. Morning	0.6 kg [1.3 lbs.] bear's-meat (the last of the old bear) 2 pieces hardtack Coffee and biscuit.
Aug. 13, 11.30 a.[p.]m. Dinner	Bread, sardines cheese cakes Fresh bear's-meat, heart, brain (1½ kg [3.3 lbs.]) short ribs of bear. Bear broth with meat in it, with this bread and wheat-meal biscuit fried

Aug. 14, 4.30 p.m. Morning	Mixed meat dish: bear's-meat, ribs, heart, brain, kidneys and ivory gull, (bread) Coffee and wheat-meal biscuits
Aug. 15, 12.30 a.m. Dinner	Coffee and butter bread and biscuits
(no march on account of rain and wind)	
Aug. 15, 6 p.m. Supper	1.5 kg [3.3 lbs.] mixed bear's-meat and bear-broth with boiled meat Bread and biscuits.

These dishes alternated during the remainder of the journey. The bear's-meat rations increased to 1.2 kg [2.6 lbs.] at breakfast and supper, 0.3 [.7 lbs.] at dinner after Aug. 20. On Aug. 21 in the evening two [3] bears were shot, of which were taken the kidneys, brain, and pieces from the back.

We made very good blood-pancake of bear-blood and oatmeal fried in butter and eaten with butter.

Of the Mellin's food "water" we also tried to make pancakes with good results.

Proposals for alterations in the next polar balloon expedition.

The drag-lines to be sheathed in metal.

The car in the bearing-ring.

The gas to be somewhat heated by boiling water in the car and condensing the steam in a sheet-iron vessel in the balloon.

The balloon of the same cloth about 6000 cub. met. [212,000 cu. ft.] in volume.

Logbook II

This logbook contains observations for the period September 5—October 2, more inventories of food, and the shorthand letters that Strindberg addressed to his fiancée (see next chapter). The following menu is alone pertinent or novel enough to require reproduction.

Banquet Sept. 18, 97

on an ice-floe immediately east of . . .

Seal-steak and ivory gull fried in butter and seal-blubber, seal-liver, brain, and kidneys. Butter and Schumacher bread.
Wine

Chocolate and Mellin's-food flour with Albert biscuits and butter
Gâteau aux raisins
Raspberry syrup sauce
Port wine 1834 Antonio de Ferrara given by the King.
Toast by Andrée for the King with royal Hurrah!
The national anthem in unison
Biscuits butter cheese.
A glass of wine
Festive feeling
During the day the Union flag waved above the camp.

Strindberg's Shorthand Letters to His Fiancée

> *"Up in the bearing-ring it is confoundedly pleasant. One feels so safe there and so at home. One knows that the bumps up there are felt less and this allows one to sit calmly and write without having to hold on."*
>
> STRINDBERG'S ALMANAC, p. 30.

July 21 1 a.m. Greenwich time,
on an ice-floe: 82° 38.7′ N. lat., 29° 40′ E. long. Gr.

. . . .

. . . .

. . . .

. . . .

. . . .

. . . .

I wrote my last letter to you the same day we started, you must have received it, of course. Of what has happened since you have learned from the accounts in the papers, etc., but naturally I shall describe my personal impressions, too. It was grand when it was at last determined that we should start. Andrée, Frænkel, and I and Machuron went on shore and looked at the balloon from the roof of the balloon-house. After we had discussed the possibilities of starting for a while Andrée asked us what we th[ought]: "Shall we try it or not?" Frænkel at first answered evasively, but then said that [we?] should on . . . I answered "I think we ought to try it," and Svedenborg was of the same opinion. Andrée was serious and said nothing. We all went on board again. We did not know yet what was going to be done, but when we had come on board Andrée said at once to Ehrensvärd: "Well, we have been considering whether to start or not; my comrades insist on starting, and as I have no absolutely valid reasons against it, I shall agree to it, although with some reluctance. Will you send all hands on shore to begin the work of dismantling the balloon-house?" And then everyone woke up. The sailors had never worked so willingly before, nor had the carpenters. But now they were happy! I stayed on board awhile talking to Ehrensvärd and the doctor, and getting together my things and some instruments that were still on board. Andrée went on shore to direct operations.

The harbour now presented a lively picture. Two sealers had just come in and one had been lying there before. The latter had to shift anchorage so as not to be in the way of the balloon. The weather was gloriously beautiful and the wind a fresh S S W.

I went ashore and packed a few articles in the car of the balloon and arranged some things here and there. The work of removing the front side of the house went on briskly, and one plank after the other was thrown down. The balloon stood there steady and secure, protected against . . . the winds by the canvas on the fourth and fifth floors. I took some photographs of the work. Then I went on board again with Svedenborg for a moment to fetch some things that had been forgotten and then I compared chronometers for the last time. When we came on board breakfast was just being served and we were persuaded to sit down to table in company with the captain and the doctor. The captain ordered up a bottle of champagne and a toast was drunk to a prosperous journey for us. Everyone enjoyed the breakfast, but when I went on shore again time did not allow of the others getting anything to eat before the start. We had to satisfy ourselves with sandwiches and ale in the car. When I came ashore again the work had made good progress and the balloon was being allowed to lift a little. Some small balloons were let go to test the direction of the wind, which proved favourable. It was quite an inspiring sight when the balloon had been lifted to such a height that the bearing-ring of the basket left the ground. Andrée gave orders; everyone was willing and helpful and everything went well. I walked about taking photographs up to the last minute.

The balloon had now risen to such a height that the bearing-ring was a good distance above the ground, and was held fast by three ropes. The moment had come to attach the basket. When this had been done and a sufficient number of bags of ballast had been taken on board the time had come to say good-bye. This was done heartily and touchingly but without any signs of weakness. Then Andrée cries: "Strindberg and Frænkel, are you ready to get into the car?" Yes! and so we got in. Now my thoughts turned for a moment to you and my dear ones at home. How would the journey succeed? And how fast my thoughts came but I had to restrain them. I asked Machuron, who stood nearest and whom I had found most congenial, to give my love to you. I wonder if a tear did not tremble on my cheek

at that moment. But I had to see that the camera was in order and to be ready to throw out ballast etc. And now all three of us stand there on the top of the car. There was a moment's solemn silence. Machuron says: *"Attendez un moment! Calme."* The right moment comes. "Cut away everywhere!" comes Andrée's voice. Three knives cut the three lines holding fast the bearing-ring and the balloon rises amid the cheers of those below; we answer with a cheer for old Sweden and then we rose from the balloon-house. A peculiar sensation, wonderful, indescribable! But one has no time for much thought. I photograph for a while and then we see that we are descending. Ballast is thrown out but we dip into the sea a moment. Then we rise again. And now everything seems to be going all right. We can still hear the hurrahs at a distance. I take one or two more photographs and then prepare the last card to you which I intended to throw down on Holländar Naze. But forgot it.
Good night!

July 22.

* * *

It is nearly 7 p.m. and we have just packed our sledges ready and intend to start from our landing-place. Yes, now we are starting [?] o'clock G.M.T.

We shall see how we shall manage to get to Cape Flora; the sledges are heavy to pull. Yes, now we are going. . . .

At the 1st camping-place 7/22, 12 o'cl. midnight [before the 23rd].

. . . .

Well, now your Nils knows what it is to walk on the Polar ice. We had a little mishap at the start. When we were crossing from our ice-floe with the first sledge it went crooked and fell in. It was with difficulty we succeeded in getting it up. I climbed down up to the knees and held fast the sledge so that it should not sink. Andrée and Frænkel crossed over to the other ice-floe and then suddenly we managed to get the sledge up but I expect that my sack which was on the sledge is wet inside. And it is there that I have all your letters and your portrait. Yes, they will be my dearest treasure during the winter. Well, my dear, what will you be thinking all winter? That is my only anxiety.—Well, after we had got the sledge up again we piloted ourselves across some floes with channels of water between. The way we did it was by making the ice-floes move quickly so that they came near each other. This was slow work with the large floes of course. At last we came on to a large field of ice across which we travelled with our sledges two or three kilometers [1¼–2 miles]. Each is loaded with about 160 kg. [350 lbs.] so that they are very heavy and during the last hour what we did was for all three of us to help with one sledge at a time. Now we have encamped on a picturesque bit of ice and have pitched our tent. In the tent we have our sleeping-sack in which all three of us are now lying side by side. It is a squeeze but the fellowship is good. Well, there is much I should write about but now I must sleep. Good night.

* * *

Woke up at 11.30 o'cl.
Cooking and tidying.
Start 2.15 o'cl.
Difficult leads in the ice. Andrée and I of different opinions respecting the crossing of the channel. Scanty dinner. After the midday-meal we covered some km. (one or two). Night-camp by a large hummock (4m high). I made soup with peas, rusks, soup-tablets and Rousseau meat-powder. . . .

* * *

July 24, 12.05 o'cl. G.M.T. (25 . . .)

We have just stopped for the day, after drudging and pulling the sledges for ten hours. I am really rather tired but must first chat a little. First and foremost I must congratulate you, for this is your birthday. Oh, how I wish I could tell you now that I am in excellent health and that you need not fear for us at all. We are sure to come home by and by . . . . yes, how very much all this occupies my thoughts during the day, for I have plenty of time to think and it is so good to have such pleasant memories and such happy prospects for the future as I have, to think about!

(*Later.*) Now we have camped for the night and had coffee and eaten our sandwiches with cheese and h . . . biscuits and syrup and . . . Just now we are putting up the tent and Frænkel is taking the meteorological observations. Now we are enjoying a caramel, it is a real luxury. You can fancy we are not over-delicate here. Yesterday evening I gave them (for it is I who attend to the housekeeping) a soup which was really not good, for that Rousseau meat-powder has a bad taste one soon becomes tired of it. But we managed to eat it in any case. . . .

Well, we have stopped for the night on an open place, round about there is ice, ice in every direction. You saw from Nansen's pictures how such ice looks. Hummocks, walls, and fissures in the sea alternating with melted ice, everlastingly the same. For the moment it is snowing a little but it is calm at least and not especially cold (—0.8°). At home I think you have nicer summer weather.

Yes, it is strange to think that not even for your next birthday will it be possible for us to be at home. And perhaps we shall have to winter here for another year more. We do not know yet. We are now moving onwards so slowly that perhaps we shall not reach Cape Flora this winter, but, like Nansen, will have to pass the winter in an earth-cellar. Poor little Anna, in what despair you will be if we should not come home next autumn. And you can imagine how I am tortured by the thought of it, too, not for my own sake, for now I do not mind if I have hardships as long as I can come home at last .

. . . .

. . . .

Now the tent is in order and we are going to our berths. We are all rather tired but in good humour. We discuss our mental characteristics and our faults, a very educative . . . I chat with . .

. . . .

The (2) 5,7 at 9 p.m. G.M.T.

. . . . . We awoke today about 12 o'clock but as it was rainy and . . . we remained in the tent and slumbered till three. Then we rose and I cooked a little food—cocoa and condensed milk and biscuits and sandwiches. At 4.30 o'cl. we started and now we have drudged and pulled our heavy sledges for four and a half hours. The weather is pretty bad: wet snow and fog, but we are in good humour. We have kept up a really pleasant conversation the whole day. Andrée has talked about his life, how he entered the Patent Office, etc. Frænkel and Andrée have gone ahead on a reconnoitring tour. I stayed with the sledges and now I am sitting writing to you. Yes, now you are having evening at home and you, like I, have had a very jolly and pleasant day. Here one day passes like another. Pulling and drudging at the sledges, eating and sleeping. The most delightful hour of the day is when one has gone to bed and allows one's thoughts to fly back to better and happier times. But the immediate object now is our winter-place. We hope to find things better in the future. Now the others are coming back and we shall continue the drudgery with the sledges. Au revoir. . . .

July 31, 10 a.m.

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Now it is a long time since I chatted with you. Since then the situation has . . . . . the evening . . . . . . m . . . . . . large channel . . . . we determined to alter our equipment the next day so that each of us could pull his own sledge. The method we had hitherto employed of all three pulling one sledge and then going back and fetching the other sledges took too much time. On July 26 we crossed the lead and then on the other side we unloaded our goods and then began to unpack in order to leave some of the provisions and equipment here.